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AUTHOR Casey, William E.
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ABSTRACT

News coverage of the environment has been the subject of intense scrutiny for some 25 years. Content analyses have suggested that environmental coverage is plagued by omission of important information in areas of economics, health, safety, and consumer concerns. Surveys of reporters show high levels of frustration and dissatisfaction with their output. And universities are being blamed by editors, publishers, and corporate giants for providing irrelevant education and delivering incompetent products. Few journalists are trained in the philosophy, history, economics, and natural sciences necessary to fully comprehend the subject. New solutions for the teaching of environmental communication are needed. The problem is that an educational construct for environmental journalism and communication has not yet been identified. This research identifies and presents such an educational model via a comprehensive evaluation of the literature and an in-depth analysis of the few undergraduate programs nationwide currently offering specializations in the environmental communication fields. (Contains 31 references. Appendixes list individual school program courses; a list of courses and their sources in six general areas of study; the classification scheme/program content model; the literature review content model/general topics; and profiles of the eight programs examined.) (Author/RS)

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Reno

Environmental Journalism and Environmental Communication Education: Identifying an Educational Model

A thesis submitted

in partial fulfillment

of the requirements for the degree of

Master of Arts in Journalism

by

William E. Casey

Jennifer D. Greer, Thesis Advisor

May 1998

CS 510 319

William Casey

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ABSTRACT

Environmental Journalism and Environmental Communication Education: Identifying an Educational Model

By

William E. Casey

May 1998

Chair: Jennifer D. Greer

News coverage of the environment has been the subject of intense scrutiny for some 25 years. Content analyses have suggested that environmental coverage is plagued by omission of important information in areas of economics, health, safety, and consumer concerns. Surveys of reporters show high levels of frustration and dissatisfaction with their output. And universities are being blamed by editors, publishers, and corporate giants for providing irrelevant education and delivering incompetent products.

Few journalists are trained in the philosophy, history, economics, and natural sciences necessary to fully comprehend the subject. New solutions for the teaching of environmental communication are needed. The problem is that an educational construct for environmental journalism and communication has not yet been identified.

This research identifies such an educational model via a comprehensive evaluation of the literature and an in-dep analysis of the few undergraduate programs nationwide currently offering specializations in the environmental communication fields.

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CHAPTER I

INTRODUCTION

The Problem and its Setting

Environmental Journalism and Environmental Communication

Environmental journalism is a fast-growing field that developed in the early 1980s as the media and public alike became increasingly aware of environmental dangers (Bond, 1995). One of the challenges of environmental journalism is the fair representation of both sides of an issue. In addition, the environmental journalist's role is to serve as mediator and interpreter of complex scientific data (Bond, 1995).

Since the environmental news beat was born some 25 years ago, news coverage of the environment has been the subject of intense scrutiny. Content analyses have suggested that such coverage is plagued by omission of important information, too much emphasis on crises and conflicts, and limited use of sources (Archibald, 1996). Broadening the scope of environmental reporting also is believed to be important. Like the concentration on a few sources,

journalists concentrate on too few environmental subjects. This approach neglects important topics, particularly in areas of economics, health, safety, and consumer concerns (Foundation for American Communications [FACs], 1993).

One of the few surveys of environmental reporters conducted to date found a high level of frustration among the reporters and dissatisfaction with their output (Archibald, 1996). Reporters said they did not follow any standard routines for finding news and that they searched for stories that would be "relevant" to their readers. They said environmental topics generally took more time than other news stories. The reporters did not define the environmental beat as a science beat, nor was it seen as an "agency" beat. The beat was seen in a broader sense, as being about the interaction of people and nature. Reporters saw the role of the beat primarily as explanatory and educational and also as an independent analyst of environmental issues and policies. The problems these reporters faced included not enough time or space to understand, cover, and write about these multi-level, subtle, and often uncertain issues. Another problem was dealing with editors who had little interest in the environment and nontraditional news stories (Archibald, 1996).

In addition, environmental journalism regularly upsets some of the most powerful vested interests in society. There has been a backlash by industry against environmental

monitoring of all kinds, including environmental journalism (Grossman & Filemyr, 1996). Because this backlash has become more intense, students of journalism should learn that, practically speaking, there are limits to what environmental reporters can do. Environmental reporting requires substantial preparation not just in understanding fundamental scientific concepts but also in addressing social, political, and philosophical questions concerning how we live in relation to the natural world (Grossman & Filemyr, 1996).

Environmental communicators must be able to dissect diverse audiences, frame and reframe messages, and know by rote the processes of media, public relations, advertising, and education (Valenti, 1994). Valenti asserts that the communication process depends on an understanding of audience and message content and working relationships between the sources of information and the intended receivers. In environmental communication, that means reporters must understand science. They also must understand scientists, mass media, media professionals, and a wide range of industries. They need to understand the growing number of government agencies and bureaucrats, and a public segmented by a myriad of interests, only to be resegmented the next day (Valenti, 1994).

Environmental journalism also is more complex to cover than more traditional journalism beats (Ackland, 1993). Public- and private-sector leaders worldwide increasingly

recognize that environmental decisions involve complex economic, scientific, political and social considerations. They recognize that the way environmental information is framed and understood by the public has a major impact on public policy. That is where journalists come in. They have the responsibility to distill, translate, and communicate complicated environmental issues to the public and decision makers. To perform this important task, journalists must themselves be well informed (Ackland, 1993).

According to a Freedom Forum summary report (Freedom Forum, 1993), environmental reporters must know chemistry, biology, economics, politics, and law rather well. They must have a grasp of statistics, meteorology, geology, and geography. They must be aware of history, philosophy, religion, and literature. And they must have mastered journalistic technique.

A 1993 survey of 512 reporters and managers from newspapers and television revealed deep concerns about the quality of news coverage and fundamental problems with the way environmental stories are handled. The study showed that 72% of the 512 surveyed reported that, in general, reporters lack the training and background to cover stories on technical environmental issues (FACs, 1993). According to the study, even reporters who specialize in environmental reporting have little formal education in the sciences. While nine out of 10 were college graduates, only 2% studied the sciences. The rest majored in journalism, English,

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literature, history, the fine arts, or government.

According to Lamay (1991), the problem is few journalists are trained in the philosophy, history, economics, and natural sciences necessary to fully comprehend the subject. Journalists should advocate for more systematic inquiry, for teaching and educating.

This concern is of growing importance because the Foundation for American Communications' Press and the Environment study (FACs, 1993) also found that news coverage of the environment is increasing. Forty-six percent of reporters, editors, and news directors said their newspapers and television stations had expanded coverage in the previous two years. But journalists were highly critical of the quality of that coverage. Only about 3% of the journalists said they considered overall environmental coverage to be "very good," while all responses averaged "mediocre." The study clearly showed that even reporters who specialize in environmental reporting believe they can benefit from better education and better understanding of technical, economic, and public policy issues (FACs, 1993).

Despite the emerging importance of media coverage of environmental issues, no central textbook exists for college faculty who are preparing to teach environmental journalism (Grossman & Filemyr, 1996). However, according to Grossman and Filemyr, students in undergraduate and graduate programs have indicated a keen interest in environmental communications and it is likely that this interest will not

abate in the future. Rather, it seems clear that more students will need to be trained to take an interdisciplinary and multidisciplinary approach to environmental journalism and environmental communication education to grasp the wide range of issues and their interrelationships. The demand for environmental journalists and communicators with this expertise continues to grow (Grossman & Filemyr, 1996).

Assumptions

These studies together present a challenge for journalism and communication schools and educators, and a few assumptions can be made at this point:

The first assumption. The first assumption is that many journalists do not have the educational background needed to cover complex environmental issues.

The second assumption. The second assumption is that there is a present and growing need for individuals educated and trained in environmental journalism and environmental communication at the undergraduate level.

The third assumption. The third assumption is that the need for environmental education for students desiring careers in environmental journalism and environmental communication will continue. Having the necessary educational background to cover and communicate complex environmental issues is important for informed decision making.

The fourth assumption. The fourth assumption is that environmental journalism is more complex to cover than more traditional beats. This suggests, potentially, the need for a more complex education.

The fifth assumption. The fifth assumption is that environmental journalism and environmental communication students will need to take complementary courses in the natural and physical sciences and other environmentally related sciences and studies to better understand and communicate complex environmental issues to the public.

The Statement of the Problem

An educational model for environmental journalism and communication has not yet been identified. This research proposes to identify and evaluate the existing environmental education components of undergraduate environmental journalism and environmental communication programs and to compare those findings with the suggestions for environmental education found in the literature. It is hoped that an educational model will be revealed from this inquiry. The model would come from these evaluations.

The Subproblems

The first subproblem. The first subproblem is to determine whether undergraduate environmental journalism and environmental communication programs listed in the 1996 Directory of Science Communication Courses and Programs in

the United States (The Directory) offer similar courses and areas of study within their environmental education component. Only those programs leading to a specific bachelor's degree in environmental journalism or environmental communication will be investigated, thus narrowing the population to the degree program models available for evaluation. Because an emphasis has been placed on the study of science, science writing and communication programs will be included as well if there appears to be an environmental component within the program.

The second subproblem. The second subproblem is to determine and distinguish subject matter, topics of environmental inquiry and study subsumed within the individual courses being offered in the degree-granting programs.

The third subproblem. The third subproblem is to evaluate the environmental content of each program in relationship to the other programs, and to compare the findings with the findings from the literature.

The Definitions of Terms

Environmental Education. Environmental education suggests courses that engage a student in exploration and discovery of the interrelationships and mutual interdependencies between the natural and physical sciences, including ecology, environmental sciences, earth sciences, and arts and humanities.

Environmental Communication. Environmental communication is a specific field of inquiry where the communication of scientific and environmental information to lay audiences is the objective. Similar educational programs with different program names have been designed for the training and education of people desiring careers in this field. Some of the names of these programs are: science writing, science communication, environmental journalism, environmental communication, natural resources journalism, et al.

Environmental Courses. For this study, environmental courses are defined as courses and seminars within the environmental communication programs suggesting environmental or science education, such as natural resources management, or combined courses such as environmental reporting.

Environmental Content. Environmental content comprises the subject topics within the courses that serve to make them distinct from the journalism or communication component of the degree and available for evaluation.

Interdisciplinary. Interdisciplinary suggests the identification of questions through the lenses of different disciplines, the identification of concepts and the formulation of generalizations within a theme, and the identification of knowledge content and how that content is unified. In short, interdisciplinary promotes a holistic means for placing a great amount of seemingly disconnected knowledge into an integrative, mutually interdependent

context, as well as promoting a creative learning environment for both student and teacher. The use of authentic assessment and student portfolios usually predominate over exams for assessing student learning in interdisciplinary education.

The Importance of this Study

Purpose and Benefits

The demand for graduates at the bachelor's level with competence in environmental studies and the broader field of journalism and/or mass communication is far higher than what currently is emerging from American campuses. But interest in this career field is expanding as the environmental issues being faced are becoming ever more prevalent on the minds of the public (Grossman & Filemyr, 1996). Grossman and Filemyr suggest that the addition of undergraduate environmental journalism and environmental communication programs to American colleges and universities would bring attention to the opportunities within the fields of environmental journalism and environmental communication and serve to attract serious and capable students into the appropriate preparatory college programs.

The purpose of this study is to identify and evaluate the content of environmental communication programs currently listed in the 1996 Directory of Science Communication Courses and Programs in the United States (The Directory) regarding the environmental education component

of the undergraduate degree. This study seeks to identify from that evaluation a content model of the environmental topics. In addition, the study will compare those findings with the basic principles and fundamental educational areas suggested in the literature review.

Comparison between the literature and the programs may lead to an undergraduate environmental education component -- an environmental educational program and approach model worth emulating at journalism and mass communication programs seeking to incorporate environmental journalism or environmental communication into their curriculum. Because many journalists now begin their careers immediately after college, an undergraduate program model for the training and education of future environmental reporters and communicators would benefit many. This study is designed to:

- Identify and evaluate the existing environmental education among the few undergraduate environmental journalism and environmental communication programs available nationwide.
- Identify a program model that would be beneficial for students desiring careers in the environmental journalism and environmental communication fields.
- Identify a program model for administrators and educators in currently established journalism and/or mass communication programs seeking evidence for potential program content evaluation.

- Benefit colleges and universities nationwide considering implementation of an environmental journalism or environmental communication program.
- Benefit the public at large expecting in-depth coverage and communication of vital environmentally related information from the media and other professional sources.

The development of an undergraduate program model for the training and education of environmental reporters and communicators is a first step toward establishing academic consensus. The content of courses and areas of study beyond a traditional journalism education now deemed important and being suggested -- natural and physical sciences, environmental studies, policy and law, etc. -- should yield insight regarding current trends in content development.

Because many journalism and mass communication administrators and educators are proposing additional or complementary courses in other areas of study to better prepare students for careers in environmental communications or journalism, this study will facilitate developmental steps toward an agreed upon undergraduate program model for these careers. In addition, an excellent environmental studies program model may emerge from the data as well. Future reporters who plan on covering complex environmental issues could benefit greatly from an interdisciplinary environmental communication education prior to beginning

their careers.

Many American universities and colleges are aware of the growing trends in environmental education at the secondary education level. These students, having grown up on expanded media coverage of environmental issues -- global and regional -- are seeking colleges with an emphasis on environmental awareness, thus permitting the students access to knowledge and to means for protecting the environment, conserving finite natural resources, creating a sustainable society, etc. Environmental communication and environmental journalism are salable programs and, for some schools, welcomed programs.

This study also should provide beneficial information for those schools wishing to implement an environmental studies program. An undergraduate program model for environmental communication or journalism may provide additional opportunities for recruitment of students wishing to advance their understanding and career objectives relative to "environment."

CHAPTER II

LITERATURE REVIEW

Overview

Little formal research exists on environmental communication or on general environmental education content for college students. However, the few studies that have been completed on environmental education at the college level suggest numerous avenues for education on environmental issues.

From those studies, themes relevant to the goals of environmental communication education emerge. Many of the themes presented suggest the need for an interdisciplinary approach to environmental education. Some suggest an even deeper inquiry into the subject.

The review of the related literature suggests that education and training of future environmental communicators and journalists requires additional studies in the sciences and other environmentally related areas. General themes regarding an environmental education emerge. These themes suggest that the study of natural sciences and ecology are required. Environmental sciences and natural resources

sciences also are required, as well as the study of general sciences and environmental studies. An interdisciplinary educational approach is required as well.

Reasons for Environmental Education

According to some general studies on how people learn about the environment, the public relies on mass media sources for getting that information. Newspapers are a primary source of environmental news (Atwater, 1988), and are used most often, followed by television (Ostman & Parker, 1987). Because the quality of the information is important for informed decision making, the studies suggest a need for improvement in the quality of coverage when communicating or reporting on environmental issues.

People who have decided to work in the environmental communication field have an unusual responsibility as messengers who raise issues that directly affect the health and survival of humankind and the biosphere (Grossman & Filemyr, 1996). According to Grossman and Filemyr, environmental reporters should be prepared to ask probing questions, to challenge fundamental assumptions, and to make clear connections. Students should be taught to ask difficult questions when investigating and writing environmental stories. It is not acceptable simply to poke a microphone in front of the face of the spokesperson for Exxon and be told that the mess in Prince Island Sound is not "that bad," and then write an article that simply

juxtaposes the ecological destruction with the corporation's denial (Grossman & Filemyr, 1996).

Grossman and Filemyr also contend that an environmental journalist covering a story about a toxic chemical leak must be prepared to report not just about the effects on employees exposed to the chemical but also about pertinent regulations and legislation governing the chemical in question. Any health effects also would include the larger environmental impacts of the chemical on air, water, and soil. The story should point out who manufactures and distributes the chemical, what industrial uses it has and what less toxic materials or processes could be substituted for it. The article could point out who benefits and who suffers by the current use of this chemical. In gathering and reporting on this information, the reporter should strive for fair and accurate coverage to respond to community concerns regarding past, present, and future exposure to the chemical (Grossman & Filemyr, 1996).

Christiansen (1994) asserts that environmental journalism that brings people together with a shared understanding of the issues we are confronting is needed. However, Breen (1994) contends that many journalists face problems and difficulties when attempting to cover environmental issues properly. Reporters need to measure the weight of scientific evidence and not just present dueling quotes. Furthermore, most environmental issues contain much uncertainty, and reporters must not ignore this or jump to

conclusions. Brookes (1991) contends that many journalists have become press agents for the agenda of environmental groups, and journalists routinely ignore scientific reports that refute popular eco-logic. Breen and Brookes each suggest the need for understanding science and the need for science-based courses incorporated into students' journalism education if the students wish to communicate or cover environmental issues.

Environmental Education for Environmental Journalism and Environmental Communication Students

General Attitudes

De Laney (1997) asserts that a large percentage of the American population is scientifically illiterate and has a poor attitude toward science and scientists. In response, many science educators have launched nontraditional science curricula that are believed to be relevant to students. These curricula are known as environmental science or science/technology/society (STS). De Laney's findings showed the impact of these curriculum programs on high school and college students. Investigation of college student attitudes toward science suggest that college students exposed to an environmental science curriculum appear to have more positive attitudes and less stereotypic imagery of scientists than those who have had exposure to a traditional science curriculum. Non-science majors' attitudes toward

science appeared to improve significantly when they are exposed to an environmental science curriculum.

In addition, female college students exposed to an environmental science curriculum manifested significantly more positive attitudes toward the adoption of scientific attitudes, career interest in science, and reduced stereotypic imagery of scientists than those that had not been exposed. Environmental science curriculums appear to have a greater positive effect on females than males (De Laney, 1997).

Faulconer (1993) contends that for centuries there have been two philosophical orientations toward nature. One assumes humans to be the rightful owners and managers of nature -- anthropocentric; the other is founded on a belief that humans are equal citizens within the Earth's biotic community -- biocentric. Today, according to Faulconer, these two approaches, anthropocentric and biocentric, are located in reform environmentalism and deep ecology respectively. In the 1950s and 1960s, the focus was almost entirely on wise-use conservation and reform environmentalism. In the last two decades, even though reform environmentalism remains a dominant influence, there has been a definite trend toward incorporating deep ecology concepts into this educational discourse (Faulconer, 1993).

According to Radile (1994), a biocentric perspective is an alternative to the anthropocentric assumptions of mainstream social studies education. Radile asserts these

assumptions have led to a critical disregard for the human causes of the environmental crisis.

Stolp (1994) asserts that current educational discourse concerning the natural world emphasizes a view of the environment as "event." Viewing the world as an event trivializes a sense of "place" and promotes a dysfunctional relationship with the Earth. Moving away from event-oriented models of education toward more place sensitive forms of instruction requires enhancing the human/place relationship. According to Stolp, we must develop a moral, spiritual, and emotional connection with the Earth. Media often fail in this regard (Stolp, 1994).

Sandiford (1993) contends that people's view of the future -- evidenced by their level of concern about the future -- will influence their environmental attitudes and behaviors. According to Sandiford, pro-environmental attitudes are linked to pro-environmental behaviors and to pro-future perspectives and the environmental paradigm is changing. The most visible shift is the positive attitudes to technology. Furthermore, the new environmentalism, perhaps influenced by the Gaia Hypothesis -- a profoundly holistic view of nature named after the Greek goddess of the Earth and propounded by James Lovelock in 1979, that the Earth is a single, living organic being -- may be more about saving the Earth *for* humans rather than saving the Earth *from* humans (Sandiford, 1993).

In one study performed by Benton (1993), 88 master's of

business administration students were tested both before and after a 10-week environmental management course for attitude and knowledge about environmental issues. Results of the study showed that students were more environmentally knowledgeable and expressed greater environmental concern and were more action oriented after the course than before (Benton, 1993).

Content and Approach

In every field there is content to be covered -- basic books and primary documents, the experiences of outstanding people, the ideas and events that have shaped the discipline. Boyer (1987) contends that students should study content. Still, Boyer asserts, the great obstacle to overall general education is the fragmentation and specialization of the academy. General education is not complete until the subject matter of one discipline is made to touch another. Bridges between disciplines must be built, and the program must be seen ultimately as relating the curriculum consequently to life. In a complex, interdependent world, according to Boyer, we simply cannot afford to graduate students who fail to place their knowledge and lives in perspective. Nelson (1993) asserts that environmental education should be perceived not as something to be added to the curriculum but rather a way of addressing the established curriculum within a meaningful context.

Kim and Dixon (1993) examined the lack of

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interdisciplinary communication in environmental education programs in U.S. graduate schools. Following comparative historical reviews of environmental protection activities, a computer-developed curriculum model base containing 15 subject areas was completed. The subject areas include philosophy, politics, economics, architecture, sociology, biology, medicine, agriculture, ecology, public health, mathematics, physics, chemistry, geology, and statistics (Kim & Dixon, 1993).

Lawrence (1993) also contends that in light of the interdisciplinary nature of the knowledge of the planetary ecological system now unfolding through sophisticated scientific research, a more holistic approach to curriculum development is needed. According to Lawrence, fragmentation is no longer defensible, and this is particularly true of science, where separation of the physical and life sciences still prevails. Neither can the division between these disciplines and the social sciences be perpetuated. The widely acknowledged connection between the ecology and the economy affirms the urgent need for promotion of ecological economics (Lawrence, 1993).

Tilbury (1994) proposes that international conferences on environmental concerns may serve as a foundation for a model of environmental education. Such conferences tend to promote intellectual diversity, thus permitting inquiry into multiple avenues for solutions to problems. Clacherty (1989) contends that a discussion-based approach focused on

experiences of actual environmental issues, encountered problematically, should characterize environmental education activities.

Short and Burke (1991) contend that the purpose of engaging in inquiry is exploration, and that progress is measured by having new questions that are ready to be asked rather than answers to be passed on to others. Short and Burke assert that the answers created from inquiry will last only as long as the time needed to ask new questions and until more compelling theories and beliefs come into existence. Inquiry is not used for eliminating alternatives. It is used for finding more functional answers, and to create diversity and broaden thinking. And the research is not intended for eliminating questions but for generating new questions.

According to Short and Burke, in any learning situation, the process which supports this systematic questioning and inquiry is evaluation, because it involves gathering the information needed to continue moving forward in learning and inquiry, and it is used to give inquirers the insights they will need to guide their next exploration (Short & Burke, 1991).

Martinello and Cook (1994) assert that inquiry is the source of new knowledge and developing the ability to inquire is central to the education of those who devote their lives to explaining nature's mysteries, gaining access to them through the languages and paradigms of the sciences,

mathematics, the humanities, or the arts. Martinello and Cook also contend that inquiry (broadly defined as the search for truth, information, or knowledge) is not solely the province of scholars; it is also what ordinary people do to learn and to add meaning to their lives.

Interdisciplinary Education

The traits of interdisciplinary education proposed by Tchudi and Lafer (1996) are juxtaposed against the more traditional disciplinary approaches. Discipline-centered education tends to approach its units through concepts found in the disciplines, whereas interdisciplinary education often begins with themes, issues, or problems. Interdisciplinary education favors constructed knowledge that the students learn for themselves rather than the knowledge encapsulated in textbooks, and an emphasis on student inquiry over instructor-set topics. In interdisciplinary education, students look for connections with the real world. Instructors tend to test their students through actual or situational experiences, such as portfolios and authentic assessment, rather than exams (Tchudi & Lafer, 1996).

According to Marsh (1991), knowledge is an essential ingredient of all decision making. In planning educative actions and in deciding what the curriculum will be for a particular set of students, knowledge of many kinds is essential. Examples of knowledge include evaluative

knowledge about the way the curriculum is being carried out and its impact, critical knowledge regarding the curriculum's ethical ideals and how they are embedded in various organizational, curricular, and instructional practices. There is normative knowledge pertaining to the array of norms and values that are intended to guide and permeate curricular choices on a number of practical dimensions. And there is theoretical knowledge for conceptualizing the elements of the curriculum and relating them in a structure for understanding and enactment in the real world.

Marsh (1991) contends that other kinds of knowledge may be needed in educational decision making as well: philosophical, historical, scientific, ethnographic, narrative, aesthetic, phenomenological, etc., and that these may be derived through the fundamental processes of inquiry associated with each of these disciplines. Marsh asserts, however, that both interdisciplinary and disciplinary knowledge are needed for informed decision making about educational goals and about the appropriate courses of action to be taken in reaching these goals.

Martinello and Cook (1994) assert that it is tempting to think of curriculum evaluation only in cold, hard data, scientifically collected and collated, and that this type of evaluation has its place. But the integrated, interdisciplinary curriculum is dynamic, situational, interactive, and creative. There is no single model,

therefore, there can not be a single model for evaluating success. According to Martinello and Cook, teachers who are experienced with interdisciplinary thematic teaching and who feel comfortable working with their students in open-ended ways, while staying true to established curriculum standards, take on the role of mentor. While in this role, the teacher becomes a member of the research team, collaborating with the students in identifying themes for inquiry and study, giving feedback to their ideas for exploration, suggesting courses of action and ways to proceed, and participating in some of the searches.

Tchudi and Lafer (1996) assert that exciting and important curriculum deliberations have been happening. In holistic education, the focus is on the whole learner, rather than on a set of knowledge content. This focus emphasizes the linking of values and knowledge, and classrooms are created where students begin their learning as wholes, without fragmentation of learning skills or knowledge. For example, in global and multicultural education, interdisciplinary instruction is suggested, because worldwide issues -- global warming, peace, homelessness, hunger, aging, commerce, the quality of life -- cut across the humanities and the sciences, and interdisciplinary knowledge is required for solutions.

According to Tchudi and Lafer, these movements toward interdisciplinary curricula are gaining a foothold in the schools, but other trends in contemporary education are

headed in directions other than interdisciplinary, such as common learning, the establishment of national content standards discipline by discipline, and the establishment of a national testing program that could re-entrench old disciplinary models. They favor an interdisciplinary curricula that includes:

- integrated thematic education
- holistic instruction
- constructive learning
- whole language teaching
- math, science, history, and everything else across the curriculum
- hands-on or active learning
- multicultural education
- student-centered teaching
- education for critical thinking and problem solving
- global education
- community-directed or 'real-world' education

Tchudi and Lafer (1996) contend that teachers need to loosen the structures within which they plan courses and lessons to allow for the contingencies of exploration, the unknown, and uncertainty. Teachers also must be followers at times, taking directions from students as questions lead to quests for new understandings. Simultaneously, teachers must find ways to interject the curriculum with disciplinary knowledge within the context of the quest and assist in

developing skills that allow for more effective learning. The use of structures and processes used by the various disciplines to make knowledge are among those skills. They stress that good interdisciplinary thematic teaching is tightly bound to clearly defined goals and objectives, and that although teachers still provide direction, the path to goals and objectives is of necessity less clearly defined than with the more traditional modes of instruction.

According to Tchudi and Lafer, under the best interdisciplinary exploratory conditions, teachers and students blaze paths together, with the teacher serving as the seasoned guide and the most capable for recognizing and pointing out the signs that mark the trail. Curriculum must essentially come to be understood as a process that allows methodology to evolve from the interaction with the students, and in a way becomes something less than a blueprint and something more like a set of intellectual procedures that allow students to observe, interpret, and act upon what is being observed -- a means for making sense of their world (Tchudi & Lafer, 1996).

Research Questions

The objective of this research is to discover and report on the knowledge content currently being presented to the students in the undergraduate environmental programs. The goal, however, is that an educational model will be identified. It is hoped that such a model will emerge from

the identification, comparison, and evaluation of the existing environmental education in the programs and in the comparison of those findings with the suggestions and determinations revealed in the review of the literature.

Because many American universities and colleges are aware of the growing trends in environmental education at the secondary education level, and because many graduating high school seniors are seeking colleges to help them prepare for careers in environmental communication, this study will provide information on current environmental courses and course content. For schools wishing to implement an environmental communication or environmental journalism program, the information from this study should be helpful.

The demands for the education and training of future environmental communicators and journalists are changing, causing many journalism and mass communication administrators and educators to propose additional or complementary courses in other areas of study, such as natural and physical sciences, as a means of better preparing students for careers in environmental communications. This study will facilitate the development of an undergraduate environmental education content model for the training of future environmental communicators and reporters.

Because evaluation may reveal an ideal program model, this research also will develop other questions for further inquiry into that model and its evolution.

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Research Question #1: Will commonly suggested courses and areas of study deemed important in the programs yield insight into current trends in curricular content? Will such commonly suggested courses emerge from the schools' program materials -- descriptions of each program, titles of the program's core courses, descriptions of the core courses, and other recommended courses? Essentially, what is being offered? Do patterns emerge?

Research Question #2: Can the schools' program courses reveal mutually inherent or core topics, content currently in place, identified by analyzing the course syllabi of the program courses in the schools offering such programs? What are the topics? What is the content? Can themes be identified? Can generalizations be made?

Research Question #3: Can an environmental education content model be developed from the data? If so, how does the content model compare with the content being offered in the schools? Will a comparative analysis reveal which programs come closest to the content model? How do the programs compare to each other? Do the programs offer similar content? If not, what are the differences?

Research Question #4: How does the content model compare with the content suggestions and advisements found in the literature? Of the programs found to be closer to the content model, which programs reflect congruency with the content suggestions and advisements found in the literature

review? How do the educational approaches of the programs compare with the advisements in the literature? Which programs more closely resemble the overall integrative and interdisciplinary approaches being suggested?

Research Question #5: Can a comparative evaluation of the program research findings and the suggestions and determinations revealed in the literature yield insight into an ideal program model? If yes, how does that ideal model compare with the programs able to serve as models now? Can an educational model be identified?

Expectations

As mentioned earlier, there are varying -- and often differing -- perspectives on how best to prepare undergraduate journalism and communications students for professional careers in environmental communications and reporting. Some suggest the need for additional courses in environmental sciences, environmental studies and/or the basic physical and natural sciences. Some suggest a need for incorporating policy and law studies into the journalism curriculum, while others suggest an emphasis be placed on philosophy, psychology, cultural anthropology, or the technologies of various sub-fields in the environmental sciences. Generally speaking, most all suggest additional course work in science.

It is expected that each school's undergraduate program will have similarities in content and educational approach.

It also is expected that differences, large and small, exist. Chances are good the evaluation will reveal an integrative, interdisciplinary approach within most of the programs. A secondary emphasis or minor in either the natural or physical sciences, or health and safety, etc., may be part of the programs and suggested throughout.

Most likely, there will be some concerted effort on the part of the schools to combine science and environment with journalism and communication in individual courses, such as environmental reporting.

It is expected that an evaluation of each school's program descriptive material will reveal the core courses and general themes present in the program. Each program's educational approach -- integrative and interdisciplinary, or fragmented and disciplinary -- may be revealed as well. It also is expected that from a comparative evaluation of the programs, patterns and themes among them will emerge, too.

From an analysis of the content subsumed within the core courses and other advised courses in the programs, patterns are expected to emerge. From these patterns, content categories and general areas of study are expected to emerge. It is expected that these content categories and general areas of study will form the content model that will be used for evaluating the overall environmental content presented in the schools.

In addition, it is expected that a comparison between

the programs and the suggestions and determinations revealed in the review of the literature will determine which of the programs more closely resembles what has been suggested. Also, the evaluation of what is currently being offered and what is being suggested, together, is expected to yield some insight into an ideal educational model.

CHAPTER III

METHOD

Population

The Directory

A search for directories and guides on environmental journalism and environmental communication majors yielded only one good source, the 1996 Directory of Science Communication Courses and Programs in the United States. Other searches for directories of the combined majors at university and local libraries had no result. General college guides did not supply the information needed for evaluations of the programs. Internet requests to two different listservs -- Society of Environmental Journalists (SEJ), and Brown University's environmental discussion list -- produced nothing beyond The Directory.

In a telephone conversation with Jim Detjen, president of the International Federation of Environmental Journalists and director of the environmental journalism program at Michigan State University, Detjen confirmed that The Directory was probably the best, if not the

only directory of its kind available for the purposes of this research. However, Detjen pointed out that The Directory was still evolving and not yet complete, pointing to his own programs initiated in 1995 not being included in the 1996 version.

Although the search for other directories and guides continued, without success, The Directory remained as possibly the only complete source available for finding the programs that would ultimately appear in this study. It lists undergraduate and graduate programs, as well as a wide array of writing and communication courses.

The Directory includes courses and programs that offer training in communicating science to lay audiences. The information in it is believed to be current as of spring 1996. According to its authors, an attempt was made to make a distinction between communicating with general vs. specialized audiences. Those responsible for The Directory's current findings define science very broadly to include -- in addition to traditional science and social science fields -- such applied domains as medicine, environmental sciences, technology, and engineering (The Directory, 1996).

The Directory describes most -- but probably not all -- science communication courses and programs available in U.S. universities and colleges. The authors queried any institution suggested to them as a possible training site, as well as several that had no history of such instruction. They mailed, phoned and e-mailed requests for information to

relevant faculty and received answers in most cases (The Directory, 1996). The authors of The Directory have chosen to emphasize only course content with overt science communication dimensions, and most of the training sites listed are rich in faculty and courses that provide good, generic training in communication skills and processes.

The Directory is really a fifth edition of sorts. The original directory was published in 1978 by Rae Goodell of the Massachusetts Institute of Technology, Sharon Friedman of Lehigh University, and Larry Verbit of SUNY Binghamton. An updated version was issued by Verbit in 1983. The first edition of the current directory, compiled by Sharon Dunwoody and Jocelyn Steinke, was issued in 1991 (The Directory, 1996).

While the 1991 directory listed 48 universities offering such coursework, the 1996 version contains 43. Some universities have folded their science communication programs because relevant faculty have retired and have not been replaced (for example, Stanford and Roosevelt universities). Others have undergone more substantial changes. Still other universities have embarked on new courses and programs.

According to its authors, the intent of The Directory is to provide the reader with enough detail about course offerings to enable preliminary comparisons, as well as enough detail to allow follow-up inquiries. E-mail addresses for contact people are listed, and a few schools provide

their World Wide Web home page locations. The Directory also includes more than 100 faculty involved in teaching such courses (The Directory, 1996).

The population of interest for this study are the schools offering undergraduate degrees with an emphasis or specialty in environmental journalism or environmental communication as posted in The Directory. Science writing and science communication and journalism programs are included if there is an environmental education objective present.

Narrowing the Field

Of the 43 schools listed in the 1996 version of The Directory, 18 appeared to offer undergraduate programs in science journalism or communications, or environmental journalism or communications nationwide. Although the other 25 schools offered a wide array of courses and programs, they did not offer an undergraduate degree in the specializations required for this research. Because each of the 18 listed in The Directory included e-mail addresses and the names of the program directors, requests for undergraduate program materials were initiated in August 1997 to confirm which schools and which programs would be included in this study.

From the materials received between September and December 1997, 10 schools ultimately met the criteria for this study. The inclusion criteria required that the program

being offered had to emphasize science or environmental communication, offer a bachelor's degree with the program's designation (such as a B.A. in environmental communication), or offer an explicit specialty or emphasis in science or environmental communication within the parameters of an undergraduate degree in journalism or communication. In addition, the program had to be listed in The Directory.

The eight other schools were eventually excluded because they either did not offer an undergraduate degree program in environmental journalism or science writing, or they offered only a limited number of courses in science writing or environmental communication. For example, although the University of Maryland is listed as having an undergraduate specialization in science communication, according to Diane White of the journalism school the programs are primarily limited to graduate and post-graduate students and the undergraduate specialization does not exist at this time.

Although it is likely there may be other programs available out there that would meet the criteria for this study but were not listed in The Directory, those other programs have not yet been formally identified. However, based on the on-going efforts of Directory author Sharon Dunwoody, et al, The Directory has been acknowledged by academicians, such as Detjen, as salient.

The Ten Schools

The ten schools and their undergraduate degree programs included in this study are:

Bowling Green State University -- B.A. and B.S. in Scientific and Technical Communication.

Cornell University -- B.A. in Communication, with a concentration in life sciences communication.

Iowa State University -- B.A. in journalism and mass communication, with a science communication emphasis.

Lehigh University -- B.A. in science writing or science and environmental writing.

Michigan Technological University -- B.A. and B.S. in scientific and technical communication.

Ohio State University -- B.A. in environmental communication, education, and interpretation.

University of Minnesota-Twin Cities -- B.A. and B.S. in scientific and technical communication.

University of Tennessee-Knoxville -- B.S. in communications with a science communication emphasis.

University of Wisconsin-Madison -- B.S. in natural science with an emphasis in science writing.

Western Washington University -- B.A. in environmental studies/journalism, and B.A. in mass communication and environmental education.

Research Question Methodology

Research Question #1: What are the commonly suggested courses and areas of study in the programs? What is being offered? Do patterns emerge?

From the program literature forwarded to the researcher through December 1997, core course and other required course titles in the individual programs emerged. General themes also began to emerge. Although in some cases the introductory brochures included information on the actual courses offered, additional information was required from nearly all of the 10 schools regarding the courses in their programs, including descriptions of the courses as they appeared in the general catalogs. Generally, similar courses were grouped together, forming a few general areas at first. However, more information was needed about these courses before any determinations regarding content and specific context could be made.

Research Question #2: What is the content being presented in the courses? What are the themes? Can generalizations be made?

Course syllabi were needed for evaluating specific course content, subject topics, and educational approach. All available core course syllabi and other advised course syllabi required for this study were received by March 1, 1998.

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Generally speaking, three requests for information were made with each of the 10 schools: (1) program descriptions, (2) courses and descriptions, and (3) course syllabi.

A content classification scheme was developed for indexing all core and advised course class discussion topics presented in eight of the 10 schools. From the syllabi, 618 primary topics emerged. Many individual topics naturally merged into general areas, such as sciences or studies. Other topics needed to be checked for the context of the course the topic was presented in to better determine its placement. The general mergings were then differentiated into specialized areas of inquiry, producing 22 contextual categories. These 22 categories were then regrouped into three main general areas of study: sciences, environmental studies, and environmental communications.

The classification scheme developed for this research was reviewed by Dr. Laird Blackwell, Chair of the Humanities Department, and Dr. Charles Levitan, Director of Natural Sciences, both of Sierra Nevada College at Lake Tahoe. Blackwell and Levitan approved the classification scheme as an acceptable scheme for a content analysis. Two major considerations regarding the scheme were presented to this researcher by the reviewers. Blackwell pointed out the need for objectivity regarding the development of the scheme, and he emphasized that an absence of predeterminism regarding the scheme was required of this researcher. Based on his conversation with this researcher, Blackwell was satisfied

that the classification scheme met those requirements. Levitan pointed out that the classification scheme alone should not be thought of as an educational model, although it does define the many particular areas of interest generally subsumed within environmental programs. According to Levitan, education is more than content.

Research Question #3: Can an environmental content model be developed from the data? If yes, how does that model compare to the programs? Which of the programs comes closest to the model? How do they compare to each other?

The classification scheme used for indexing the discussion topics (content) provides a model for contextually categorizing the content presented in the programs. The model (classification scheme) is comprised of all the primary discussion topics in 22 contextual categories. Each program will be compared to the content model to determine which of the programs come closest to the model in overall contextual categories presented. Category 'hits' are based on syllabi topics matching topics within the categories. This model also will serve for evaluating the similarities and differences between programs. Generally speaking, individual programs will be matched for total categories present within the program. The similarities and differences between the eight programs will be determined by the categories present or absent in each program.

Research Question #4: How does the content model compare with the content suggestions found in the review of the literature? How do the educational approaches of the programs compare with the advisements in the review of the literature? Which programs more closely resemble the overall integrative and interdisciplinary approaches suggested in the literature?

An evaluation of the literature will reveal a general model comprised of content and context. Similar to the development of the classification scheme that formed the program content model, the literature model will develop from the mergings of the topics into similar categories, then grouped into general areas. The content and context suggested will be greatly limited to overall subject categories, such as science, or philosophy. However, the model that emerges from the literature will represent the general views of the cites regarding what knowledge is required for success in the fields of environmental journalism or communication. This model can then be compared with the program content model that emerged from the classification scheme.

Reviewing the syllabi for student assessment techniques in each course will be used for determining whether the interdisciplinary or disciplinary approach is being used. This will be evidenced by the use of portfolios and authentic assessment versus exams. Currently, this is the only available means for determining whether the program

courses are interdisciplinary -- actual class participation is required for a more thorough evaluation, which is beyond the scope of this research. A review of all syllabi used in this study will reveal which student assessment methods are being used in each course and, generally, in which programs.

Thus, an overall general educational model of content and approach resulting from an evaluation of the literature will be compared to the program content model and the approaches used in the individual programs. This evaluation will reveal which programs more closely resemble the suggestions and advisements cited in the review of the literature and which programs are currently available to serve as models for emulation elsewhere.

Question #5: Can a comparative evaluation between the program content and approach model and the content and approach model that emerged from the literature yield insight into an ideal educational model? How does that ideal model compare to the program models that emerged in the earlier inquiry? Can a singular, all-encompassing educational model be identified?

Theoretically speaking, an ideal model can be created from the findings. The content and approach model of the programs will be compared for congruency with the content and approach model that emerged from the literature. An evaluation of both will yield overall similarities and differences, and generalizations can then be made.

For comparing the programs to the generalized ideal model, content and contextual congruency will be evaluated using the content models, and the interdisciplinary approach will be evaluated on the basis of required student portfolios and authentic assessment vs. exams. An educational model should emerge from the findings. Its identification should be structured to reflect and represent the findings from the literature and the programs.

CHAPTER IV

FINDINGS

The Directory

The Directory served as a springboard for further inquiry, and it supplied enough information for determining there would be 10 schools included in this study. However, repeated attempts for course descriptions and syllabi from two schools had no result. Thus, the findings are based on complete information available from eight schools. Two schools that did not respond to requests and are therefore excluded from this analysis are the University of Wisconsin-Madison and Michigan Technological University.

Research Question #1: What are the commonly suggested courses and areas of study in the programs? What is being offered? Do patterns emerge?

In the broadest sense, all 68 core and other suggested or required courses from the eight programs naturally merged into six general areas of study. The six areas of study and the number of commonly suggested courses in each area suggest, overall, what is being offered throughout the

programs:

- Environmental studies (17)
- Natural resources sciences and management (15)
- Environmental communication (12)
- Science communication (11)
- Environmental sciences and management (9)
- Ecology sciences (4)

Within environmental studies (17), four general areas of inquiry emerged because of their specialized areas of inquiry:

- Philosophy and Ethics (6)
- Social (6)
- History (3)
- Law and Policy (2)

Individual School program courses appear in Appendix A. Courses and their sources as they merged into the six general areas of study appear in Appendix B.

Research Question #2: What is the content being presented in the courses? What are the themes? Can generalizations be made?

The Syllabi

Course syllabi, for the most part, are fairly straightforward. They include enough information in them for

the incoming student in the course to determine how many times in a week the class meets, when and where the class meets, final submission dates for papers and exams within the semester, required books, instructor names and telephone numbers, office hours, and a host of other particulars. They also usually provide a short synopsis on each class session: the topics to be covered, the required readings and assignments, and other expectations of the student and of the instructor.

From the course syllabi, the environmental topics emerged, albeit most likely less in number than what was actually covered during the particular class sessions or what appeared in the readings. Preliminary analysis of the information based on course titles within the respective programs suggested there would be some courses most of the programs would have in common, some courses some of the programs would have in common, and some courses unique to each program. An analysis of the syllabi reduced the general course descriptions of study into their smaller components: the particular subjects presented to the students for integration -- the subject topics or course content.

Syllabi for 68 courses from eight programs yielded more than 700 primary discussion topics. Eliminating duplications reduced that number to 618. Most all of the topics naturally merged into similar content areas, with some requiring a bit more investigation into the context the topic was presented in before determining category

placement. The components of the mergings were then checked with the individual syllabus for each course for contextual congruency.

The Classification Scheme

The total content formed a classification scheme with 22 contextual categories. The 22 categories and the number of topics presented in numerical value in each category are:

Ecology (71)

Energy (50)

Environmental Studies - Laws and Regulations (44)

Natural Resources Management (44)

Environmental Studies - Historical (42)

Environmental Science (39)

Science Communications (36)

Environmental Studies - Philosophical (35)

Environmental Communications (28)

Environmental Communications - Literary (28)

Environmental Studies - Policy and Law (26)

Environmental Communications - Edu. and Interpretation (22)

Communications (21)

Environmental Studies - Social (21)

Environmental Science - Assessment and Imp. Statements (18)

Environmental Science Management (17)

Environment/Science Communications (15)

Science (15)

Natural Resources (15)

Health Communications (14)

Environmental Studies - Cultural (9)

Health (8)

The content classification scheme used developed out of the mergings of 618 discussion topics into 22 contextual categories. The 22 categories formed three general areas of study: sciences, environmental studies, and environmental communications. The complete scheme appears in Appendix C.

Reorganization of the scheme for ranking categories numerically for total topics within each category, within the three general areas of study is represented as:

1. Sciences (277 topics) 45% of total topics
   - Ecology, Ecological Systems - Ecosystems (71)
   - Energy (50)
   - Natural Resources Management (44)
   - Environmental Science (39)
   - Environmental Science - Assessment and Impact Statements (18)
   - Environmental Science Management (17)
   - Science (15)
   - Natural Resources (15)
   - Health (8)
2. Environmental Studies (177 topics) 28% of total topics
   - Environmental Studies - Laws and Regulations (44)
   - Environmental Studies - Historical (42)
   - Environmental Studies - Policy and Law (26)

Environmental Studies - Philosophical (35)

Environmental Studies - Social (21)

Environmental Studies - Cultural (9)

3. Environmental Communications (164 topics) 26% of total

Science Communications (36)

Environmental Communications (28)

Environmental Communications - Literary (28)

Environmental Communications - Education and Interpretation (22)

Communications (21)

Environment/Science Communications (15)

Health Communications (14)

Percentage of Programs Matching the 22 Categories

The eight programs are compared to the classification scheme. Topics retrieved from syllabi predominated the comparisons for each program. However, topics retrieved from course descriptions and from program descriptions also were used if the syllabi were not available. For example, sometimes required program courses listed in the program literature or general catalog are offered under different departments. The parent department(s) for the program responded to syllabi requests, but the other department(s) did not. Case in point: Lehigh University; syllabi for the primary courses in the program were received and provided about half of the topic matches. The rest of the matches were determined from the basic information supplied in the

program's description supplied by the school. Course descriptions were not available. Another example: Bowling Green; the parent department did not supply syllabi for the courses, but the environmental studies department did.

Although this method raises the question of confidence in the findings, it is fair to say that such confidence could be measured on the strength of the information source, with (S)syllabi suggesting strong confidence, (C)course descriptions suggesting confidence, and (P)program descriptions suggesting weak confidence. The findings represent a high level of confidence to this researcher for the following reasons: total category matches for the eight programs equal 128, total matches with syllabi equals 81% (104:128), total matches with syllabi and course descriptions equals 90% (115:128). A great effort was placed on representing each program fully, including content particulars derived from the weaker of the three aforementioned sources.

Percentages of the programs (8:8 = 100%) matching each contextual category in rank from most to least are:

(1) Sciences

Ecology 100% (8:8)

Environmental Science 87% (7:8)

Natural Resources 87% (7:8)

Energy 75% (6:8)

Natural Resources Management 75% (6:8)

Science 75% (6:8)

Environmental Science - Assessment and Impact Statements 50% (4:8)

Environmental Science Management 50% (4:8)

Health 37% (3:8)

(2) Environmental Studies

Environmental Studies - Laws and Regulations 87% (7:8)

Environmental Studies - Philosophical 87% (7:8)

Environmental Studies - Policy and Law 87% (7:8)

Environmental Studies - Social 87% (7:8)

Environmental Studies - Cultural 62% (5:8)

Environmental Studies - Historical 62% (5:8)

(3) Environmental Communications

Environment/Science Communications 87% (7:8)

Communications 75% (6:8)

Environmental Communication - Literary 75% (6:8)

Science Communication 75% (6:8)

Environmental Communication 62% (5:8)

Environmental Communication - Education and Interpretation 50% (4:8)

Health Communication 25% (2:8)

Themes

Generally speaking, topics within Ecology and Environmental Science are present throughout the programs, supplying a rich mix of content -- about 20% of the total topics in the classification scheme. Four categories within Environmental Studies are present throughout most of the

programs: Laws and Regulations, Philosophical, Policy and Law, and Social -- another 20%. Environment/Science Communication, Communications, Environmental Communication - Literary, and Science Communication also account for about 20% of the total topics.

Nearly 60% of all topics fall into the above 10 categories, and 75% to 100% of the programs match those 10 categories. The remaining 40% of topics comprises the 13 remaining categories.

The following represents the three general areas of study, the 22 categories, which programs matched the categories, and the source of the match with (S) representing syllabi, (C) representing course descriptions, and (P) representing program descriptions:

Match Source

(S) syllabus

(C) course description

(P) program description

(BG) Bowling Green (Co) Cornell (Io) Iowa (Le) Lehigh
(Mi) Minnesota (Oh) Ohio (Te) Tennessee
(WW) Western Washington

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	BG	Co	Io	Le	Mi	Oh	Te	WW
Sciences								
ECOLOGY	S	S	S	P	S	S	S	S
ENERGY	S	S	S	P	S		S	S
ENV SCI	S	S	S	P	S	S	P	S
ENV SCI AS	S		S			S	S	
ENV SCI MGT	S		S		S	S	P	
HEALTH		S		S			S	
NAT RES	S	S	S	P	S	S		S
NAT RES MGT	S	P	S		S	S		S
SCIENCE		S		S	S	C	S	C
Env. Studies								
E S CULTURAL	S	S		P	S			S
E S HISTOR		S		P	S	S		S
E S LAWS/REGS	S	S	S	S		S	S	S
E S PHILO	S	S	S	P	S	S		S
E S POL/LAW	C	S	S	P		S	S	S
E S SOCIAL	S	S	S	S	S		S	S
Env. Comm.								
COMM	C	S		S	C	S		S
ENV COMM		S		S		S	S	S
ENV COMM - E/I		S			C	S		P
ENV COMM - LIT	C	S	C		S		S	S
ENV/SCI COMM		S	S	P	C	S	S	S
HEALTH COMM		S					S	
SCI COMM	C	S	S	S	C		S	

Research Question #3: Can an environmental content model be developed from the data? If so, how does that model compare to the programs? Which of the programs comes closest to the model? How do they compare to each other?

Although a content model can be developed from the data, it will be limited in its scope. This is due to the inability of the model to distinguish between individual topics heavily addressed and those that are simply touched upon in the courses' class discussions. However, the classification scheme used for indexing the content provides a model for determining the overall discussion topic areas presented for inquiry and the total concepts presented for integration. The 22 categories of the scheme provide a model for evaluating the 618 topics as presented within 22 different contexts.

The total topics presented in each program compared to the total content model provides a means for determining which contextual categories the program's content is presented in. Comparing each program's contextual categories to the total contextual categories presented for all programs combined resulted in distinguishing which categories of the scheme the programs matched. A ranking of order of the programs for determining which of the programs comes closest to the model in overall categories presented yields the following:

1) Cornell 90% (20:22)

2) Western Washington 77% (17:22)

3) Lehigh 72% (16:22)

4) Minnesota 72% (16:22)

5) Bowling Green 68% (15:22)

6) Ohio 68% (15:22)

7) Tennessee 68% (15:22)

8) Iowa 63% (14:22)

How the programs compared with the model of 22 categories overall was determined. Program emphases for each school are ranked in order of the three general areas presented and include percentages of categories presented in each area:

Cornell: Environmental communication 100% (7:7)
Environmental studies 100% (6:6)
Sciences 77% (7:9)

Western Washington: Environmental studies 100% (6:6)
Environmental communication 71% (5:7)
Sciences 66% (6:9)

Lehigh: Environmental studies 100% (6:6)
Sciences 66% (6:9)
Environmental communication 57% (4:7)

Minnesota:	Sciences 77% (7:9)
	Environmental communication 71% (5:7)
	Environmental studies 66% (4:6)
Bowling Green:	Environmental studies 83% (5:6)
	Sciences 77% (7:9)
	Environmental communication 42% (3:7)
Ohio:	Sciences 77% (7:9)
	Environmental studies 66% (4:6)
	Environmental communication 57% (4:7)
Tennessee:	Sciences 77% (7:9)
	Environmental communication 71% (5:7)
	Environmental studies 50% (3:6)
Iowa:	Sciences 77% (7:9)
	Environmental studies 66% (4:6)
	Environmental communication 42% (3:7)

In total content presented, Cornell, Western Washington, Lehigh, and Minnesota, rank in order of being closest to the content model, with percentages of categories present above 70%. Cornell and Western Washington come closest at 90% and 77% respectively.

Of the three general areas, sciences were most thoroughly covered in four of the eight programs: Minnesota,

Ohio, Tennessee, and Iowa. Environmental studies were most thoroughly covered in three of the eight programs: Western Washington, Bowling Green, and Lehigh. And environmental communication was most thoroughly covered in one program: Cornell.

Other Comparisons

Another program-to-program comparison, using the results of the content model evaluations and the six-part model of general areas that emerged from the syllabi titles, resulted in some generalizations regarding the nature and focus of each program:

Cornell offers a science communication program.

Western Washington offers an environmental sciences and studies communication program.

Lehigh offers an environmental studies communication program.

Minnesota offers a natural resources and environmental philosophy communication program.

Bowling Green offers an environmental sciences and natural resources communication program.

Ohio offers a natural resources and environmental sciences communication program.

Tennessee offers a science communication program.

Iowa offers a natural resources science and management communication program.

The comparison distinguishes the difference between primarily science communication programs and primarily environmental communication programs. The two programs in order of closeness to the content model for science communication include:

Cornell:	Science communication (1) closest
Tennessee:	Science communication (2)

The six programs in order of closeness to the content model for environmental communication include:

Western Washington:	Environmental communication (1) closest
Lehigh:	Environmental communication (2)
Minnesota:	Environmental communication (3)
Bowling Green:	Environmental communication (4)
Ohio:	Environmental communication (5)
Iowa:	Environmental communication (6)

Because Cornell comes closest to the content model for a program in science communication at 90% and Western Washington comes closest to the content model for a program in environmental communication at 77%, and because these percentages reflect congruence with the other program comparisons, how the two programs compare to each other distinguishes the contextual differences that each program is based on. Generally speaking, Cornell's program in science communication primarily draws upon a background

comprised of inquiries into science, technology, medicine, health, and communications. In contrast, Western Washington's program in environmental communication draws heavily upon inquiries into ecological sciences, environmental sciences and management, natural resources sciences and management, environmental studies, and communications.

Research Question #4: How does the content model compare with the content suggestions found in the review of the literature? How do the educational approaches of the programs compare with the advisements in the review of the literature? Which programs more closely resemble the overall integrative and interdisciplinary approaches suggested in the literature?

A content model emerged from the review of the literature. Using the same methods that were used for the development of the classification scheme, all topics cited in the literature naturally merged into six general areas similar to those that emerged from the mergings of the syllabi titles. The six general areas of content that emerged from the review of the literature and the number of topics in each area include:

Environmental studies (20)

Science (10)

Environmental sciences (8)

Communication (7)

Natural resources sciences (6)

Ecology sciences (4)

See Appendix D for the content model that emerged from the review of the literature. All the topics cited were compared to the program content model. Of the 22 contextual categories in the classification scheme, there were 21 matches. One category, energy, did not yield a match.

The review of the literature yielded 95% congruency with the program content model. A comparison of the six-part model that emerged from the evaluation of the literature with the six-part model that emerged from the syllabi:

Syllabi	Literature
Ecology sciences	Ecology sciences
Environmental sciences & mgt.	Environmental sciences
Natural resources sciences & mgt.	Natural res. sciences
Environmental studies	Environmental studies
Science communication	Science
Environmental communication	Communication

Generally speaking, the content model that emerged from the literature is 95% representative of the program content model in contextual categories, suggesting that either something is missing from the literature or something more is available in the program content model. However, it is fair to conclude that as far as content is concerned, the

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program content model represents the suggested knowledge required for success in the fields of environmental journalism or environmental communication.

Evaluations of course syllabi for student assessment for Cornell and Western Washington resulted in both programs being disciplinary in their approach, based on an absence of portfolios or authentic assessment and an abundance of exams in 100% of the courses offered. This also was true for Bowling Green, Iowa, and Minnesota.

Tennessee, although basically disciplinary, hinted toward authentic assessment in 50% of its six courses in the form of student projects weighing more than exams toward the final grade for the course. Although Ohio offered two interdisciplinary courses out of 10 (20%), the program was basically disciplinary in its approach. Lehigh, with one interdisciplinary course out of six (17%), also was basically disciplinary.

Generally speaking, excluding the Tennessee program, the programs are somewhat equal in their disciplinary educational approach. Although Cornell comes closest to the program and literature content models for a science communication program, Tennessee comes closest to the interdisciplinary suggestions found in the literature for a science communication program. Western Washington remains closest to the program and literature content models for an environmental communication program.

Research Question #5: Can a comparative evaluation between the program content and approach model and the content and approach model that emerged from the literature yield insight into an ideal educational model? How does that ideal model compare to the program models that emerged in the earlier inquiry? Can a singular, all encompassing educational model be identified?

A comparative evaluation between the program content and approach model and the content and approach model that emerged from the review of the literature yields some insight into an ideal educational model for students of environmental journalism and communication. As mentioned earlier, the two models are very similar in content, with the model that emerged from the literature being 95% representative of the program content model. The program content model had one category that did not appear in the literature content model: energy.

The primary difference in educational approach between the two is that in the literature model there is great emphasis on the integrative and interdisciplinary approach for education, whereas in the approaches used in the six programs, there is little evidence of the interdisciplinary approach, based on a lack of student portfolios and authentic assessment for grading. Most all courses in all six programs rely on written assignments, quizzes, and exams for grading.

An ideal educational model does emerge from the

comparison. Generally speaking, the ideal model is comprised of the program content model and the integrative and interdisciplinary educational approaches suggested in the literature.

A comparison between the ideal model and Cornell suggests a need for a more interdisciplinary educational approach. The same is true for Western Washington. A discussion regarding the differences between the Cornell and the Western Washington programs is found in Chapter V.

Although an ideal educational content and approach model can be identified for both programs, the goal of this study is to identify an ideal educational model for the training and education of future environmental journalists and reporters. Thus, a singular, all-encompassing educational model is identified as the combination of the two content models presented in this study and the integrative and interdisciplinary suggestions and advisements cited in the literature -- rich in content, integrative, and interdisciplinary.

CHAPTER V

DISCUSSION

The purpose of this research was to identify and evaluate the content of environmental communication programs currently listed in The Directory regarding the environmental education component of the undergraduate degrees. This research sought to identify from that evaluation a content model of the environmental topics. The findings were compared to the basic principles and fundamental educational areas suggested in the review of the literature.

As a developmental step toward the establishment of an environmental educational program model for future students of environmental journalism and environmental communication, this research presents an opportunity for educators and program administrators to determine if their current specializations within the majors can be reorganized to provide new tracks toward these environmental specializations. Until many more colleges and universities offer these specializations, and until some sense of uniformity in educational content and approach has been

agreed upon, the future quality of environmental journalism and communication will remain uncertain. These research results portray an ideal content and approach model to work toward, and questions regarding the evolution of such a model are posed.

Content

The findings show an emphasis on environmental studies, natural resources, environmental sciences, environmental and science communications, and ecology. The classification scheme indexed the total content topics available for analysis, creating a total program content model for comparing individual programs to, and to each other. As expected, each program had similarities and differences in content. Some programs emphasized environmental studies, while others focused on the environmental sciences. All the programs had an ecology component, and to a large degree a content-rich curriculum in general for integration.

Comparisons of each school program to the overall program content model's 22 contextual categories resulted in Cornell University's program coming closest to that overall model by matching 90% of the overall model's categories. Western Washington University's program matched 77%, followed by Lehigh University and The University of Minnesota matching 72%. Bowling Green State University, Ohio State University, and the University of Tennessee matched 68%. Iowa State University, matching 63%, was furthest away

from the program content model.

Comparing each program's matching categories with course syllabi permitted some generalizations to be made about the individual programs, and doing so distinguished the programs from each other regarding their offerings. For example, Cornell offers a science communication program whereas Western Washington offers an environmental sciences and studies communication program. Programs with a strong communication component also were differentiated from programs that did not reflect a strong communication emphasis, such as Iowa and Bowling Green.

The content model that emerged from the review of the literature was compared to the overall program content model. There was 95% congruency between the two models, suggesting a strong correlation between the suggestions found in the literature and what was currently being offered by all the programs combined: the overall program content model. In addition, comparing the six general areas of inquiry found in the literature with the six general areas that formed from the evaluation of the syllabi of all the programs combined were nearly identical. Generally speaking, the content required for successful environmental reporting or communication was established by the suggestions found in the literature and affirmed and confirmed with the overall program content model that emerged from the research.

Ecology, energy, and natural resources management ranked highest in total topics presented at 71, 50, and 44 topics,

respectively. Health and environmental studies - cultural ranked lowest at eight and nine topics in each category. Of the eight school programs, 100% discussed ecology and 87% discussed laws and regulations and environmental science, suggesting an emphasis on ecological and environmental sciences and the laws and regulations currently in place relative to these sciences.

Thus, the content model serves to present the findings of what is being discussed in the individual programs relative to their contextual emphases. However, the total contextual categories present in each program also need to be evaluated for the overall context for each course as represented in its syllabus for determining contextual congruency and then for its generalized program emphasis and objective.

The general difference between the Cornell and the Western Washington programs can be summed up simply: Cornell offers a science communication program rich in science, health, and technology content that includes, in part, environmental studies. Western Washington offers an environmental communication program rich in ecology, environmental science, and natural resources content for examining environmental issues. This research established Western Washington University's program in environmental studies/journalism leading to the bachelor of arts degree in journalism as the program closest in content and overall emphasis and objective to the models that emerged from the

program and literature content evaluations for environmental communications.

Approach

Generally speaking, the findings showed a traditional disciplinary educational approach in all the programs, unlike the interdisciplinary approach called for in the literature. Evaluations of course syllabi for student assessment resulted in an overall absence of student portfolios and a favoring of exams for student evaluation and grading.

Although authentic assessment and student portfolios are a good indicator of the interdisciplinary educational approach at work, the absence of these does not necessarily mean that the programs are not interdisciplinary in their nature and scope. Identification of questions through the lenses of different disciplines still can be present, as well as the identification of concepts and the formulation of generalizations within a theme. The identification of knowledge content and how that content is unified may be present as well.

This research did not determine if those other avenues for study are present in the programs. However, it is reasonable to expect that some effort is being made regarding those avenues because the findings showed that many of the programs have made a concerted effort, at least to some degree, to combine the two specializations --

journalism/communication and environment -- into singular courses reflecting issues mutually interdependent to both areas of inquiry.

Whether the programs are holistic and provide a means for placing a great amount of information into an integrative, mutually interdependent context is not known. However, it appears that an interdisciplinary umbrella of sorts can be present, or can be created, in the form of the final senior project presented to the faculty for evaluation. Such an umbrella can serve as an omnibus capstone project for determining overall integration. If the final project reflects diversity of thought, the raising of further questions for inquiry, connections made between differing perspectives, and an underlying unity of knowledge, then it is reasonable to expect that the student's education was interdisciplinary in its nature and scope.

The Ideal Educational Model

An ideal educational model did emerge from the evaluations and is comprised of the two content models -- the overall program content model and the content model formed from a review of the literature -- and the integrative and interdisciplinary educational approaches suggested in the literature. Generally speaking, the ideal educational model includes courses in three general areas of study: sciences, environmental studies, and environmental

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communications. These general areas are complemented with courses in natural resources sciences and management, environmental sciences and management, science communication, and ecology sciences. The environmental studies component addresses questions and issues pertaining to the cultural, historical, philosophical, and social aspects of the environment. Studies in laws and regulations, and policy and law address the political and legal questions and issues.

In the ideal model, ecology sciences and the study of ecological systems establishes a foundation of interconnections from which to work. Fundamentals of energy creation and transfer, use, and abuse are present in the program, as well as the fundamentals and basics of health, management, and general science overall. In the ideal model, students are expected to have taken minimally a few introductory courses in biology, chemistry, geology and geography, meteorology, physics, architecture, and other related sciences before entering upper division courses that investigate the economic, political, psychological, social, and regulatory aspects of the content.

Above all, the ideal educational model is built on an already solid journalism or communication program, as suggested in the literature, with inquiries into the educational and interpretive aspects of environmental communication and reporting, including the literary accomplishments of those who have succeeded in effectively

communicating environmental understandings to the public. Journalistic technique and its application to mass media, media professionals, public relations, and advertising is emphasized. In the ideal model, the interdisciplinary educational approach is emphasized, with student portfolios containing ongoing projects and other authentic assessments used extensively throughout the program. An underlying theme or unity of knowledge is presented in the form of a senior project, which can take many different forms; for example: article series; books, guides, and other information literature; recorded audio and/or video presentations or performance pieces for audience viewing; or any combination of mediums.

In the ideal model, the program is rich in content and diversity, and the curriculum includes hands-on field explorations, conferences, colloquiums, and other discussion-based seminars. Many perspectives are presented, giving the student numerous avenues for research and inquiry. Critical analysis of issues includes the identification of knowledge and the potential solutions to problems based on critical thinking principles introduced throughout the undergraduate program. Developing the ability to inquire is emphasized throughout the program, and the use of electronic, multimedia research tools within a global and multicultural village construct promotes the linking of values and knowledge. Worldwide and local issues are examined from the unification of the interdisciplinary

knowledge perspective, the general themes and conditions presented for inquiry, the mutually interdependent factors and interconnections, and their application to these issues.

In the ideal model, student self-evaluation throughout the program is required and involves gathering the information needed via a process of systematic questioning and inquiry. A mentor monitors each student's progress and serves as a guide for the student into further areas of inquiry by introducing the student to additional course objectives comprised of content not yet evaluated by the student. Acquiring information, developing questions and answers, then more questions, and the development of generalizations and themes, possibly solutions, based on the integration of everything entering the student's mind and the promotion of a press for moving forward in learning and further exploration is the educational objective of the program. Students successfully completing this ideal program would be extremely well prepared for careers in environmental journalism and communication.

Limitations

This research did not attempt to predict the success of any one program regarding its environmental education intentions. Nor did this research attempt to determine or evaluate the preparation and training of students within the programs. This research also did not evaluate any schools listed in The Directory that offered courses in science or

environmental communication if the school did not have a designated program leading to a specific science or environmental communication bachelor's degree, and this research did not examine graduate or professional certification programs.

The intentions of this research were to identify the comprehensive programs listed in The Directory, identify the courses and content in the those programs, identify from the literature the suggested educational content and approaches for environmental communication or journalism career preparation, and to make the necessary comparisons and evaluations for determining what an ideal educational model would be. Although there may be a few different ways of looking at the findings, this research generally focused on establishing what is being offered in the programs. From the evaluations of syllabi, general discussion topics were indexed into a scheme for content analysis. As mentioned earlier, the primary limitation of this technique is that the scheme does not differentiate between topics heavily covered and those that are simply touched upon. However, the amount of information available for analysis was substantial and allowed for generalizations to be made.

Applications for Further Research

An ideal educational model to work toward is needed for colleges and universities interested in developing the new specializations of environmental journalism and

environmental communication. Although Cornell University and Western Washington University may serve as models for science communication and environmental communication emulation at this time, because they come closer to the content models presented in this study, both programs are limited in their respective interdisciplinary approaches as measured by student assessment methods.

Many colleges and universities nationwide offer undergraduate majors in journalism and communications. Many of those colleges and universities also offer majors in the ecological, environmental, and other sciences, as well as minors and courses in many of the areas this research uncovered. Application of the ideal program model in just a few of these colleges and universities would create opportunities for further research. Toward helping all journalism and communication schools to reorganize their specializations, the findings of this research allow for similarities and differences between the prospective schools and the current schools in this study to be made.

Can the addition of more environmental journalism and communication programs nationwide increase the quality of environmental coverage? Can the reorganization of the specializations create new avenues of exploration for students and new revenue streams for the schools? Further research is needed. In addition, there needs to be additional springboards for inquiry, and of the colleges and universities readily available for the creation of the new

specializations, many are apparently positioned for instant specialization realignment with minimal effort, which would allow for further inquiry into the ideal model's validity if used.

The evolution of the ideal program model, much like our own evolution, will be adaptive. This research began with a question: What programs are already in place for such an education? Themes emerged: This is what is already out there, and this is what is needed.

This research ends on a question: Are the findings helpful? Only an application of the ideal program model for making the needed specialization reorganizations will disclose its benefits and limitations. And that is where further and continued research is required, at the application level.

According to Valenti (1994), the groundwork for any endeavor takes leadership and someone who knows how to make the academic system function for meeting new training needs. Embodying the disciplines held near and dear to many will certainly always be essential to institutional legitimacy, and the knowledge content gained and understood from the disciplines is a required component of the ideal program model.

More to the point, Valenti also suggests that new solutions for the teaching of environmental communication are needed to stop universities from being trashed by editors and publishers and corporate giants for providing

irrelevant education and delivering incompetent products. A future formal program model based on the ideal program model and the results of the colleges and universities having used it will provide another developmental step in the evolutionary process required for the effective education and training of students pursuing careers in these new specializations. Such a future model, if applied throughout the currently available campuses, might put an end to the perceived ineptitude of environmental reporters and journalists and provide a solution to the problem that still plagues many: There are not enough people with the environmental understanding needed to adequately cover and report on environmental issues.

Conclusion

The need for environmental journalists and communicators with the environmental understanding necessary to properly cover and report complex environmental issues continues. The need for more systematic inquiry, for teaching and educating, continues. And the need for more students trained in the interdisciplinary approach in order to grasp the wide range of issues and their interrelationships continues.

This research identified an undergraduate educational construct for environmental journalism and communication. That construct, presented in this research as an ideal educational model, was created out of the suggestions and advisements found in the literature and from the findings of

the research into the few programs currently being offered. It is hoped the ideal model presented in this study will serve as a developmental step toward establishing academic consensus regarding the training and education of future environmental reporters and communicators, and also serve to facilitate dialogue and developmental steps toward an agreed upon program model for students interested in environmental communication careers.

This research also revealed an environmental studies program content model. That construct may provide a means of curriculum comparison for journalism and communication schools, and other schools considering reorganization of the specializations toward environmental communication. It also may serve to attract students wanting to advance their environmental understandings, although not necessarily for journalism or communication purposes.

Appendix E provides a substantial amount of information on the eight programs researched for this study. The appendix includes descriptions of each program, the degree(s) granted, and the courses listed in each program as they appeared in The Directory. Program descriptions, with core and other required or advised courses as they appeared in the school's recruitment brochures and other program literature is included. A dissection of each course syllabus used in this research is also provided. Required texts for each course are listed, as well as a synopsis of each course's discussion topics (presented linearly, as a topic-

thread closely resembling the subject matter as delivered to the students in the course).

The information contained in this appendix may act as a springboard for further inquiry into many areas, or simply serve to provide those interested with a source of relevant texts on numerous subject topics. It also may provide a means for comparing and contrasting the particulars of newly designed courses with courses currently offered elsewhere attempting the same objectives, as well as serve to assist in the evolution of entirely new programs altogether.

Will these findings prove helpful? It is hoped by this researcher they will.

APPENDIX A

Individual School Program Courses

OHIO

NR Environmental Interpretation and Visitor Services

NR Methods for Conservation and Outdoor Education

NR Skills for Environmental Communications

NR Environmental Science and Management

NR Ecosystem Management

NR Natural Resources Data Analysis

NR Environment: The American Experience

NR Natural Resources Policy

NR Natural Resources Management

WESTERN WASHINGTON

ENVR American Literature of Nature and Place

ENVR Methods in Environmental Interpretation

ENVR Environmental Journalism

ENVR Environmental Systems

ENVR Environmental Disturbances

ENVR Human Ecology

ENVR Environment and Resource Policy

ENVR Environmental History and Ethics

ENVR Fundamentals of Ecology

LEHIGH

JOUR Science and Technical Writing

JOUR Environment, the Public and the Media

JOUR Technical Communications *no longer taught

STS American Environmental History

STS Technology and Human Values

JOUR STS Politics of Science

JOUR STS Scientific and Environmental Controversies

TENNESSEE

JOUR Writing about Science, Technology, and Medicine

JOUR Environmental Reporting

JOUR Science Writing as Literature

COMM Science, Society and the Mass Media

COMM Seminar in Health Communications

COMM Seminar in Risk Communication

BOWLING GREEN

ENVS Introduction to Environmental Studies

ENVS Concepts in Environmental Studies

ENVS Environmental Problems

ENVS Environmental Strategies

ENVS Environmental Impact Assessment

CORNELL

COMM Communication and the Environment

COMM Public Communication of Science and Technology

COMM Science Writing for Public Information

COMM Communication in the Life Sciences

COMM S&TS Science Writing for Mass media

S&TS The Politics of Environmental Protection in America

BIO Evolution

MINNESOTA

RHET Technology, Society, and Self

RHET In Search of Nature

RHET Science, Religion, and the Search for Human Nature

NRES Orientation to Natural Resources and Environmental Studies

NRES Information Technology in Natural Resources

NRES Natural Resources as Raw Materials

NRES Conservation of Natural resources

NRES Ethics and Values in resource management

NRES Natural Resources Interpretation and Communication

NRES From Local to Global Ecology

IOWA

JIMC Science Writing

BIO Environmental Biology

CRP Environmental Planning

CRP/ES Environmental Law

E SCI/ST Global Change

E ST Energy and the Environment

GEO Environmental Geology: Earth in Crisis

ENV S Introduction to Renewable Resources

POL S/ENV S Environmental Politics and Policies

PHIL Environmental Ethics

SOC Population Problems and Society

SOC Environmental Sociology

FOR Forest Hydrology and Watershed Management

ECON Environmental and Resource Economics

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APPENDIX B

Courses and their Sources in Six General Areas of Study

(Co) Cornell (WW) Western Washington (Le) Lehigh

(Mi) Minnesota (BG) Bowling Green (Oh) Ohio

(Te) Tennessee (Io) Iowa

ECOLOGY SCIENCES

BIO Evolution (Co)

ENVR Fundamentals of Ecology (WW)

BIO Environmental Biology (Io)

GEO Environmental Geology: Earth in Crisis (Io)

ENVIRONMENTAL SCIENCES AND MANAGEMENT

NR Environmental Science and Management (Oh)

ENVR Environmental Systems (WW)

ENVR Environmental Disturbances (WW)

ENVS Environmental Strategies (BG)

ENVS Environmental Impact Assessment (BG)

E SCI/ST Global Change (Io)

E ST Energy and the Environment (Io)

ENVS Introduction to Environmental Studies (BG)

ENVS Concepts in Environmental Studies (BG)

NATURAL RESOURCE SCIENCES AND MANAGEMENT

NR Natural Resources Policy (Oh)

ENVR Environment and Resource Policy (WW)

NRES Orientation to Natural Resources and Environmental Studies (Mi)

NRES Information Technology in Natural Resources (Mi)

NRES Natural Resources as Raw Materials (Mi)

NRES Conservation of Natural Resources (Mi)

NR Natural Resources Data Analysis (Oh)

NR Ecosystem Management (Oh)

NR Natural Resources Management (Oh)

ENVS Environmental Problems (BG)

FOR Forest Hydrology and Watershed Management (Io)

ECON Environmental and Resource Economics (Io)

ENV S Introduction to Renewable Resources (Io)

SOC Population Problems and Society (Io)

NRES Conservation of Biodiversity (Mi)

ENVIRONMENTAL STUDIES

SOCIAL

CRP Environmental Planning (Io)

S&TS The Politics of Env. Protection in America (Co)

JOUR STS Politics of Science (Le)

SOC Environmental Sociology (Io)

ENVR Human Ecology (WW)

NRES From Local to Global Ecology (Mi)

LAW AND POLICY

CRP/ES Environmental Law (Io)

POL S/ENV S Environmental Politics and Policies (Io)

HISTORY

NR Environment: The American Experience (Oh)

STS American Environmental History (Le)

ENVR Environmental History and Ethics (WW)

PHILOSOPHY AND ETHICS

STS Technology and Human Values (Le)

RHET Technology, Society, and Self (Mi)

RHET In Search of Nature (Mi)

RHET Science, Religion, and the Search for Human Nature (Mi)

PHIL Environmental Ethics (Io)

NRES Ethics and Values in Resource Management (Mi)

SCIENCE COMMUNICATION

COMM Science, Society and the Mass Media (Co)

COMM S&TS Science Writing for Mass media (Co)

COMM Public Communication of Science and Technology (Co)

COMM Science Writing for Public Information (Co)

JOUR Technical Communications (Le) *no longer taught

JOUR Science and Technical Writing (Le)

J1MC Science Writing (Io)

JOUR Science Writing as Literature (Te)

COMM Communication in the Life Sciences (Co)

JOUR Writing about Science, Technology, and Medicine (Te)

COMM Seminar in Health Communications (Te)

ENVIRONMENTAL COMMUNICATION

JOUR Environment, the Public and the Media (Le)

JOUR Environmental Reporting (Te)

ENVR Environmental Journalism (WW)

COMM Communication and the Environment (Co)

COMM Seminar in Risk Communication (Te)

ENVR American Literature of Nature and Place (WW)

JOUR STS Scientific and Environmental Controversies (Le)

NR Skills for Environmental Communications (Oh)

NRES Natural Resources Interpretation and Communication (Mi)

NR Environmental Interpretation and Visitor Services (Oh)

ENVR Methods in Environmental Interpretation (WW)

NR Methods for Conservation and Outdoor Education (Oh)

APPENDIX C

Classification Scheme/Program Content Model

CLASSIFICATION OF 618 PRIMARY CONTENT DISCUSSION TOPICS IN 22 CONTEXTUAL CATEGORIES WITHIN 3 GENERAL AREAS OF STUDY

DATA SOURCES: 8 UNDERGRADUATE SCIENCE ENVIRONMENTAL JOURNALISM COMMUNICATION PROGRAMS IN THE U.S. - 68 TOTAL COURSE SYLLABI

1. SCIENCES
   - ECOLOGY, ECOLOGICAL SYSTEMS - ECOSYSTEMS
   - ENERGY
   - ENVIRONMENTAL SCIENCE
   - ENVIRONMENTAL SCIENCE - ASSESSMENT AND IMPACT
   - ENVIRONMENTAL SCIENCE MANAGEMENT
   - HEALTH
   - NATURAL RESOURCES
   - NATURAL RESOURCES MANAGEMENT
   - SCIENCE

2. ENVIRONMENTAL STUDIES
   - CULTURAL
   - HISTORICAL
   - LAWS AND REGULATIONS
   - PHILOSOPHICAL
   - POLICY AND LAW
   - SOCIAL

3. ENVIRONMENTAL COMMUNICATIONS
   - COMMUNICATIONS
   - ENVIRONMENTAL COMMUNICATIONS
   - ENVIRONMENTAL COMMUNICATIONS - EDUCATION AND INTERP
   - ENVIRONMENTAL COMMUNICATIONS - LITERARY
   - ENVIRONMENT/SCIENCE COMMUNICATIONS
   - HEALTH COMMUNICATIONS
   - SCIENCE COMMUNICATIONS

1. SCIENCES

ECOLOGY, ECOLOGICAL SYSTEMS - ECOSYSTEMS

Animals
Aquatic Organisms
Aquatic Environment - Fresh Water and Saline
Aquatics
Behavioral Ecology
Biological Diversity - Biodiversity
Biomes - Major Ecosystems of the World
Biosphere
Climate, Microclimates and Organisms
Climate, Weather, and Biodiversity
Community Ecology - Structure, Dynamics, Disturbance
Community Ecology and Succession
Darwin
Deforestation and Loss of Biodiversity
Ecological Inquiry
Ecology
Ecology and Conservation
Ecosystem
Ecosystems
Ecosystem Change: Succession
Ecosystem Ecology - Concepts, Biogeochemical Cycles, Biodiversity
Ecosystem Function: Production, Decomposition, Water Cycle
Ecosystem Structure
Ecosystems in Landscapes
Energy Transfers in Ecosystems
Evolution
Evolutionary Ecology - Processes and Population
Fertility and Mortality
Genetics
Geologic Record
Global Perspectives On Disturbed Systems
Global Climate Change
Homology
Human Action in Ecosystems
Human Adaptability
Human Modification of Ecological Processes
Individual and Population Dynamics
Landscape Ecology - Spatial Patterns
Lithosphere
Mendelian Genetics
Microclimates and Organisms
Molecular Genetics
Nature and Environment
Niches
Northwest Ecosystem
Origin of Life
Pattern and Process
Physical Environment
Physiological Ecology - Responses and Adaptations

Population Dynamics
Population Ecology - Populations, Growth, Dynamics
Population Interactions: Prey-Predator, Plant-Herbivore, Parasite-Host, Competition, Mutualism
Population Principles
Primary and Secondary Productivity
Races
Rangelands
Science of Ecology and Ecosystem Dynamics
Speciation
Species and Ecosystems
Species Interactions
Stability
Succession
Systems, Ecology, Chaos
Threats to Biodiversity
Trees
Tropical Rainforests
Varieties
Wilderness
Wildflowers
Wildlife
Wild Species
World Population

ENERGY
Alternative Energy
Biomass
Coal
Cold Fusion
Cycling of Materials
Descriptive Statistics
Earthquakes
Economics
Energy
Energy Conservation
Energy Consumption
Energy and Environmental Disturbance
Energy and Federal Lands
Energy and Matter
Energy Efficiency
Fossil Fuels
Fuel Energy Use - National and Global
Geography
Geology
Industry
Inferential Statistics
Matter and Energy
Mineral Resources
Minerals and Soils
Natural Radiation
Nonrenewable Energy Sources
Nuclear Energy

Oil and Gas
Oxides (various)
Physical Science
Photovoltaics
Probability
Radioactive Wastes
Recycling
Renewable Energy
Renewable Energy Sources
Reserves
Re-use
Science
Sciences
Solar Energy
Solar Homes, Architecture
Soil
Solid Waste
Spills
Transportation
Volcanism
Waste Disposal
Water Power
Wind Power

ENVIRONMENTAL SCIENCE
Acid Rain
Agriculture and Food Supply
Air and Air Pollution
Air Pollution Control
Anthropogenic Environmental Degradation
Atmosphere
Atmospheric Deposition
Atmospheric Disturbances
Brownfields Issues
Chemistry Concepts
Climate Change
Cycling of Materials
Earth's Crust
Environmental Pollution
Environmental Quality
Food Production and Impacts
Food Resources for the Future
Global Warming
Global Change
Grazing Lands and Agriculture
Greenhouse Effect
Ground Pollution
Hazards
Hazardous Air Pollutants
Hazardous Waste
Hazardous Waste Disposal
Issues in Environmental Science, Politics, and Economics

Land and Land Use
Land Survey Systems
Nature of Scientific Inquiry and the Biosphere
Ozone Loss - Ozone Hole
Pesticides and Bioengineered Crops
Population and Consumption
Population and Future Generations
Safety
Soil Environment - Physical, Chemical, and Biological
Solid and Hazardous Waste
Tragedy of the Commons
Water Pollution

ENVIRONMENTAL SCIENCE - ASSESSMENT AND IMPACT STATEMENTS
Biological Impact Statements
CEQ Requirements and Environmental Documentation
Economic Impact Assessment
Environmental Health and Public Safety
Environmental Impact Statements
Geological Impact Statements
Hazard Assessment
Haz-Op Analysis
Historic-Cultural Impact Assessment
Human Impacts - Visual and Noise
Federal Level - NEPA and Environmental Assessment
Local Level - Zoning, Master Plans, Subdivision
Regulations, Natural Conditions
Risk Assessment
Scoping and Coordination
Social and Neighborhood Impact Assessment
Systems Approach
Toxic Waste Modeling
Transportation Impact Statements

ENVIRONMENTAL SCIENCE MANAGEMENT
Computer Programs
Dispersion Modeling
Disturbed Ecosystem Rehabilitation
Environmental Assessment Methodologies
Environmental Planning
Environmental Strategies for Industry
Evaluation and Assessment
Hunger and Agriculture - Pesticides and Pest Control
Major Environmental Management Concepts: Biophysical, Social-Cultural, Change
Pollution Control
Restoration
Safety
Spreadsheets
Sustainable Agriculture
Sustainable Development
Toxic Waste Management
World Land Use and Abuse

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HEALTH
- Carcinogenic Hazards
- Endocrine Disruption
- Gulf War Syndrome
- Health
- Medical and Biological Technologies
- Nerve Gas
- Politics and Epidemiology
- Toxicology and Human Health

NATURAL RESOURCES
- Agriculture
- Biological Resources
- Clearcutting
- Climate
- Economic Systems
- Economics and the Environment
- Forests
- Forest Age Distribution
- Forests and Forestry
- Habitat Fragmentation
- Water Resources - Floodplains, Coastal Areas, Wetlands
- Water and Water Resources
- Wetlands
- Wildlife - Endangered Species
- Wildlife Resources

NATURAL RESOURCES MANAGEMENT
- Agroecology
- Agroforestry
- Alternative Resource Management Practices
- Conservation Law
- Conservation Management
- Conservation Plans
- Conservation Strategies
- Designing Reserves
- Drainage Basins
- Ecological Principles and Resource Management Problems
- Ecological Restoration
- Economic Models
- Economics and the Environment
- Erosion
- Event Tree Analysis
- Fault Tree Analysis
- Fire Ecology
- Fire Management
- Forest Harvesting
- Forest Hydrology
- Forest Management Planning Process
- Forest Service Resources
- Geomorphology
- Hydrologic Cycle
- Integrated Resource Management

Landscape Planning
Management of Resources
Multiple Use and Sustained Yield
Natural Resources Conservation and Management
Natural Resources Issues
Pest Management
Planners and Managers of Natural Resources - Difficulties
Planning, Inventory, Assessment, and Monitoring
Private Sector - Zoos and Wildlife Parks
Private Forestry Interests
Private Interest Groups
Proposed Alternative Management Plans
Public Participation and Comparative Evaluation
Renewable Resources
Riparian Zones
Resource Conservation
Sustainability
Trends in Resource Use, Environmental Quality, and Public Policies
Watersheds

SCIENCE
Communications and Information Technologies
Eugenics
Federal Agencies and Science
Federal Government and Science
Fraud in Science
Genetics
History of Science
History of Science Politics
Plate Tectonics
Public Attitudes Toward Science
Science and Art
Science in Institutions
Social Construction of Science
Technology and Society
Technology, Institutions, and Ideology

2. ENVIRONMENTAL STUDIES

ENVIRONMENTAL STUDIES - CULTURAL
Cultural Patterns and Change
Cultural Processes
Demographics
Green Consumerism
Dominant World Views
Environmental Values
Human-Ecology Relationship
Wilderness Attitudes
Man and Environment

ENVIRONMENTAL STUDIES - HISTORICAL
1920s and the New Deal

Alaska
American Setting
American Environmentalism
Ancient Western and Christian Views of Nature
Christian and Medieval Views of Nature
Conservation Movement
Contemporary Environmental Movement
David Brower
Early Preservationists
Earth Day
Ecological Devastation and Economic Depression
Environmental Disasters
Environmental Historiography
European Colonists
Evolution of the Environmental Movement
Forest Lands and Natural Forests
Frontier and Conquest of the West
Gifford Pinchot
Growth and Development
Hetch Hetchy
Historical Environmental Perspectives
Human Ecology and the Pacific Northwest
Human Impacts
Human Population Growth
Human Populations
Industrialization
Limits to Growth - Bhopol, North Borneo, Love Canal
Maps and Histograms
National Parks
Native Americans and Colonists
Natural History
Pastoral Ideal
Post-WWII and Environmental Movements
Problem of the Commons
Resource Use and Environmental Changes in Historical Perspective
Rio De Janeiro "Earth Summit"
Romanticism
Scientific Revolution and Modernism
Tragedy of the Commons
Wilderness Appreciation
Wise Use Movement

ENVIRONMENTAL STUDIES - LAWS AND REGULATIONS

<u>ENVIRONMENTAL ACTS</u>

Clean Air Act
Clean Water Act
Clean Water Act: Wetland Protection
Comprehensive Environmental Response, Compensation and Liability Act - Superfund (CERCLA)
Endangered Species Act
Food Security Act
National Environmental Policy Act (NEPA) and regs.

Resource Conservation and Recovery Act (RCRA)
Safe Drinking Water Act
Toxins: Emergency Planning and Community Right-to-Know Act
Washington State Environmental Policy Act (SEPA)

ENVIRONMENTAL AGENCIES
Bureau of Land Management
City, County, and State Parks
Council on Environmental Quality (CEQ)
Environmental Protection Agency (EPA)

ENVIRONMENTAL LAWS AND REGULATIONS
Air Quality and Energy
Bureau of Land Management Lands
Environmental Documents
Environmental Justice
Environmental Laws and Regulations
Environmental Regulation
Federal Water Resource Development
Global Environmental Governance
International Trade and Environmental Regulation
International Implications of NEPA
National Pollution Discharge Elimination System (NPDES)
Navigable Waters and Waters of the U.S.
Pollution Law and Policy
Public Domain: Public Land Ownership and Management
Preserves, Boundary Waters
Regulation of Non-point Sources
State Implementation Plans (SIPS)
State Forestry Regulations
Wilderness Preservation

ENVIRONMENTAL LEGISLATION
Endangered Species Legislation
Environmental Crisis and New Environmental Legislation
Evolution of Safe Drinking Water Act
National Parks Legislation
Wilderness Legislation

ENVIRONMENTAL STANDARDS
Air Pollutant Standards
Mobile Source Standards
National Ambient Air Quality Standards (NAAQS)
New Source Performance Standards (NSPS)
Water Quality Standards

ENVIRONMENTAL STUDIES - PHILOSOPHICAL
American Indian Philosophies and Relationships with their Environments
Animal rights and liberation
Carrying Capacity
Conservation Beliefs

Creationism
Deep Ecology
Ecology and Religion
Ecocentric Ethics
Ecofeminism
Ecosabatage and Civil Disobedience
Environmental Education
Environmental Ethics
Environmental Values in American Culture
Environmental Virtue
Ethical and Philosophical Considerations
Ethics
Evolution of Environmental Consciousness
Greenhouse Effect
Individual Consciousness
Koyaanisqatsi
Land Ethic
Moral Extensionism
Moral Values
Personal Ethic
Science and Advocacy
Sport Hunting
Strategic Monkeywrenching
Technology and Environment
Technology and Human Values
Technology and Society
Transcendentalism
Trapping
Understanding the Value of Nature
Wilderness Risk and Recreation
Worldviews, Ethics, and Sustainability

ENVIRONMENTAL STUDIES - POLICY AND LAW

ENVIRONMENTAL LAW
Citizen
Government
Population Policies
Property Rights
Regulation and the Courts
The Constitution

ENVIRONMENTAL POLICIES
Aesthetics
International Aspects of Natural Resources
International Justice
Mining Policy on Federal Lands
National Parks and Wilderness Policy
Utilitarian Conservation Policies
Water Pollution Control Policies

POLICY
Governments
Policies

Policy Analysis
Policy and Government
Policy, Formulation and Implementation
Policy Formulation, Implementation and Evaluation
Policy Problem Resolution
Political Process
Political Science
Private Interest Groups
Production Economics
Public Policy Process Model and Associated Concepts
Public Powers

ENVIRONMENTAL STUDIES - SOCIAL
Animal Rights
Biosocial Perspective
Citizen activism
Class
Complex Social-Technological-Ecological Systems and Implications for the Future
Ecofeminism
Environment - Political Action
Environmental Activism
Environmental Advocacy
Environmental Politics
Environmental Sociology
Environmental and Resource Economics
Gender and the Environment
Global Warming
Government
Perceptions and Attitudes in Environmental Affairs
Politics of Research
Race
Social Ecology
Social Structure
Sociology

3. ENVIRONMENTAL COMMUNICATIONS
COMMUNICATIONS
Accuracy
Analogy and Anecdote
Audience
Clarity
Coherence
Communication
Communication Process
Communication Theory
Context
Descriptive Language
Descriptive and Expository Writing Skills
Editing
Expression
Features Story
Newspaper Analysis

Newspapers
Quotes
Story Structures
Straight Journalism
Structures
Subject and Audience Conflict

ENVIRONMENTAL COMMUNICATIONS
Advertising and Environmental Issues
Advocacy vs. Traditional Reporting
Beliefs, Education, and Information
Brochures and Signs
Conflict Resolution
Environment and Television
Environmental Communication Research
Environmental Coverage Problems
Environmental Information Systems
Environmental Journalism
Environmental Journalism Techniques
Environmental Reporting
Environmental Risk and Media Coverage
Environmental Writing Styles
Environmentalism and Environmental Journalism
Environmentalism and Public Opinion
How Writers Interpret Stories for Readers of Magazines and Newspapers
International Environmental Problems and Issues
Internet Resources for Environmental Journalists
Journalism and the Environment
Media and Environment
National Environmental Issues
Native American Expression
Natural Resource Communication
News Coverage of Environmental Stories
Resources/Environmental Information through Written and Broadcast
Topo Sheets and Aerial Photos

ENVIRONMENTAL COMMUNICATIONS - EDUCATION AND INTERPRETATION
Activities for Pre-school, Lower and Upper Elementary
Activities for Jr. High, High, College, Adults
Activity Development
Concept Delineations
Definitions and Principles of Interpretation
Education
Environmental Education
History, Literature, Terminology, Philosophy
Identification Skills
Identification Methodologies
Interpreting Critical Resource Issues
Interpretive Exhibit
Interpretive Graphics

Interpretive Media
Interpretive Planning
Interpretive Research
Interpretive Slide/Tape Program
Interpretive Video with Written Script
Interpretive Writing
Managing and Marketing of Interpretive Programs
Materials Development
Module Design
Orientations of Environmental Interpretation
Techniques of Instruction in Environmental Education

ENVIRONMENTAL COMMUNICATIONS - LITERARY
Abbey, Edward
Burroughs, Edgar Rice
Carson, Rachel
Creative Nonfiction
Critical Reading of Literary Works
Dillard, Annie
Ehrlik, Gretel
Emerson, Ralph Waldo
Environment: Nature Writing (Leopold, Carson)
Historical Background of Nature Writing: European Origins
Leopold, Aldo
Literary Research
Lopez, Barry
Muir, John
Narratives and Environments
Natural History Authors
Poetic Expression
Revolutionary Philosophies
Skills Development and Practice in Natural Resource Communication
Southwest Desert Writing
State of the World
Stegner, Wallace
The Midwest
The Arctic
The Sea
Thoreau, Henry David
Voices from the Scientific Community
Western Writing

ENVIRONMENT/SCIENCE COMMUNICATIONS
Information Campaigns
Media, Translating Results of Research
New Environmental Agenda
Production of Various Forms of Presentational, Written, and Audio-Visual Communications
Writing for the Web

HEALTH COMMUNICATIONS
- Environmental Toxicology for Journalists
- Health Education
- Health Information
- Health and the New Media
- Issues in Health Promotion
- Media Coverage of Risk
- Medical Communication
- News Media and Health Issues
- Problems in Risk Media Coverage
- Risk
- Risk Assessment
- Risk Communication
- Risk Communication for Journalists
- Youth and Health

SCIENCE COMMUNICATIONS
- Anti-science as Ideology
- Basic Science News
- Contexts for Science Communication
- Controversies
- Covering Science Policy
- Cultural Science Writing
- E-mail
- Images of Science
- Images of Science in the Media
- Internet
- Investigative Science Reporting
- Models of Science Communication
- Modern Day Developments and Current Perspectives
- Newspaper and Magazine Coverage of Science
- Public Agencies
- Public Communication of Science and Technology
- Public Health Campaigns
- Public Relations for Science
- Public Understanding of Science
- Role of the Media
- Science Fiction
- Science and Media
- Science as Ideology
- Science in the Community
- Science in Movies
- Science in Museums
- Science Journalism
- Science Literacy
- Science Writing
- Science on TV and the Web
- Scientific Communication
- Scientific Journals
- Technical Communication
- Technical Writing
- Television and Health
- Stegner, Wallace

APPENDIX D

Literature Review Content Model - General Topics

ENVIRONMENTAL STUDIES

- Anthropocentric
- Arts and Humanities
- Biocentric
- Education
- Event
- Government agencies
- History
- Industries, technocrats - laws and regulations
- Interdisciplinary communication
- Law
- Literature
- Philosophy
- Place
- Political
- Politics
- Public health
- Public policy
- Science and health
- Social
- Sociology

SCIENCE

- Architecture
- Economics
- Health
- Mathematics
- Medicine
- Science
- Sciences
- Scientific evidence
- Scientists
- Statistics

ENVIRONMENTAL SCIENCES

- Earth sciences
- Environmental management
- Environmental science
- Environmental sciences
- Meteorology
- Science/technology/society (STS)
- Technical environmental issues
- Technical issues

COMMUNICATION

- Advertising
- Journalistic technique
- Mass media
- Media
- Media professionals
- Public
- Public relations

NATURAL RESOURCES SCIENCES

- Agriculture
- Geography
- Geology
- Natural sciences
- Physical sciences
- Physics

ECOLOGY SCIENCES

- Biology
- Chemistry
- Ecological economics
- Ecology

Appendix E

Program Profiles: Directory Descriptions and Listed Courses
School Program Descriptions
Core and Other Advised Program Courses
Syllabi Received - Course Titles
Course Syllabus - Texts and Topics

A (*) preceding a course signifies that the course was not used for the development of the classification scheme, but was used for comparative evaluations with the content models.

PROGRAM

Bowling Green State University
English Department
Scientific and Technical Communication

Degrees Awarded: B.A. and B.S. in Scientific and Technical Communication
Major: Scientific and Technical Communication

Directory Description

The program relies to some degree on individual planning and assessment. Each student proposes his or her unique area of specialization that the student's advisor directs and oversees. Courses are directly related to scientific and technical communication.

Listed Courses

Introduction to Technical Writing
Professional Editing
Technical Writing
Resources and Research in Technical Writing
Technical Editing

Electives are available in Environmental Science, Environmental Policy, and Occupational health.

School's Program Literature Description

Offers courses in technical writing, technical editing, computer science, visual communications, and project management. In both degree programs a technical, scientific, or business cognate area is required.

B.A. program has a strong communication core, computer science core, graphic and design requirements, and project management requirements. Suggested concentrations in various

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sciences, including two in the following: environmental studies, and journalism-related studies.

Advised Courses

Introduction to Environmental Studies
Concepts in Environmental Studies
Environmental Planning
Environmental Strategies
Environmental Impact Statements

Syllabi Received 5

SCIENCE/ENVIRONMENTAL (5)

ENVS 101 Introduction to Environmental Studies
ENVS 201 Concepts in Environmental Studies
ENVS 301 Environmental Planning
ENVS 401 Environmental Strategies
ENVS 402 Environmental Impact Statements

Syllabi

SCIENCE/ENVIRONMENTAL

ENVS 101 Introduction to Environmental Studies

Required Texts: *Living in the Environment*, G. Tyler Miller, Jr.

Topics

Population dynamics, Evolution, Human impacts, World population, Food resources, Hunger and agriculture - pesticides and pest control, Ecosystems, Niches, Species interactions, Succession, Stability, The Nature Conservancy, Forests, Rangelands, Parks, Wilderness, World land use and abuse, Wild species, Matter and energy, Energy efficiency, Renewable energy, Water and water resources, Water pollution, Air and air pollution, Acid rain, Global warming, Ozone loss, Geology, Toxicology and human health, Ground pollution, Solid and hazardous waste, Recycling, Minerals and soils, Hazardous waste disposal, Climate, weather, and biodiversity, Biological resources, Deforestation and loss of biodiversity, Economics and the environment, Politics and the environment, Political process, Worldviews, ethics, and sustainability, Environmental ethics.

ENVS 201 Concepts in Environmental Studies

Required Texts: *Living in the Environment: Principles, Connections, and Solutions*, G. Tyler Miller, Jr.

Topics

Ecosystems, Population principles, Human population, Soil, Food production and impacts, Sustainable agriculture, Forests, Forest harvesting, Tropical rainforests, Wildlife resources, Land and land use, Wilderness, Energy and matter, Nonrenewable energy sources, Renewable energy sources, Energy conservation, Water resources, Water pollution, Atmosphere, Air pollution, Mineral resources, Solid waste, Hazardous waste, Human impacts, Social structure, Economics and the environment, Political process, Environmental activism, Personal ethic.

ENVS 301 Environmental Problems

Required Texts: *The Ecology of Commerce*, P. Hawken; *Saving Nature's Legacy*, R.F. Noss & A.Y. Cooperrider; *The Tallgrass Restoration Handbook*, S. Packard & C.F. Mutel

Topics

Biodiversity, Threats to biodiversity, Conservation strategies, Reserves, Designing reserves, Forests, Rangelands, Aquatics, Management, Restoration, Environmental disasters, The state of the world, Energy consumption, Energy, Employment, Government, Economics, Recycling, Reuse, Ethics, Aesthetics, Environmental education, Sustainability, Endangered species, Endangered species legislation, Parks, National parks, National parks legislation, City, county, and state parks, Wilderness, Forests and forestry, Bureau of Land Management, Wilderness legislation, Private sector - zoos and wildlife parks, Evaluation & assessment.

ENVS 401 Environmental Strategies

Required Texts: None listed

Topics

Limits to growth - Bhopol, North Borneo, Love Canal; Chemistry concepts, Pollution control, Toxic gas modeling, Dispersion modeling, Computer programs, Spills, Hazard assessment, Haz-Op analysis, Fault Tree analysis, Event Tree analysis, Spreadsheets.

ENVS 402 Environmental Impact Assessment

Required Texts: *Environmental Impact Assessment: A Practical Guide*, Betty Bowers Marriott

Topics

Environmental Impact Statements, Historical environmental perspectives, The local level - zoning, masterplans, subdivision regulations, natural conditions, The federal level - NEPA and environmental assessment, CEQ requirements and environmental documentation, Environmental laws and regulations, Scoping and coordination, Environmental assessment methodologies, International implications of NEPA, Geological impact statements, Biological impact statements, Water resources - floodplains, coastal areas, and wetlands, Air quality and energy, Environmental health and public safety, Transportation impact assessments, Historic-cultural impact assessment, Economic impact assessment, Social and neighborhood impact assessment, Other human impacts - visual and noise, Public participation and comparative evaluation.

PROGRAM

Cornell University
Department of Communication
Science Communication

Degree Awarded: B.S. in Communication
Major: Science Communication

Directory Description

The Department of Communication offers an undergraduate program in science communication issues, especially relating to health, nutrition, the environment, and agriculture. Many new courses are currently in development, as the department is strengthening its offerings in this area.

Course work in the department includes work in theory, practical skill, and in specific science areas. The department is not a journalism/professional program; social science is emphasized.

Listed Courses

Science Writing for the Mass Media
Science Writing for Public Information
Perspectives on Science Writing
Scientific Rhetoric
Communication and the Environment
Risk Communication
Introduction to Health Communication

School's Program Literature Description

Concentration: Communication in the life sciences. Studies the impact of communication on environmental, health, science, and agricultural issues as well as public perceptions of risk.

Core Courses

Science Writing for Public Information
Communication in the Life Sciences
Science Writing for Mass Media
Public Communication of Science and Technology
Communication and the Environment
The Politics of Environmental Protection in America

Syllabi Received 7

COMMUNICATION (5)

COMM 260 Science Writing for Public Information
COMM 285 Communication in the Life Sciences
COMM/S&TS 352 Science Writing for Mass Media
COMM?S&TS 466 Public Communication of Science and Technology
COMM 421 Communication and the Environment

SCIENCE/ENVIRONMENTAL (2)

S&TS 427 The Politics of Environmental Protection in America
BIO 207 Evolution

Syllabi

COMMUNICATION

COMM 260 Science Writing for Public Information

Required Texts: *Technical Communication*, Mary M. Lay, Irwin; *Keys for Writers*, Ann Raimes, Houghton Mifflin; *The Control of Nature*, John McPhee, Farrar

Topics

Scientific communication, Technical communication, Accuracy, Audience, Clarity, Coherence, Editing, Descriptive Language, Analogy, and Anecdote.

COMM 285 Communication in the Life Sciences

Readings: scientific journals, newspapers and magazines, the World Wide Web, television, science museums and nature centers, parks, and anyplace else where communication in the life sciences exists.

Packet, various authors.

Topics

Issues in CILS, Models of science communication, Contexts for science communication, Environment: Nature writing (Leopold, Carson, Ackerman 1991), Environment: Political action, Risk communication, Public health campaigns, Medical communication, Science literacy, Science journalism, Images of science in the media, Public communication of science & technology, Social construction of science.

COMM/S&TS 352 Science Writing for Mass Media

Required Texts: *The New Science Journalists* (1995) Ted Anton and Rick McCourt, eds.; *News and Numbers: A Guide to Reporting Statistical Claims and Controversies in Health and Related Fields* (1989) Victor Cohn; *A Field Guide for Science Writers* (1997) Deborah Blum and Mary Knudson, eds.

Topics

Science, Media, Basic science news, Story structures, Quotes, Simplifying, Features story, Profiles, Science literacy, Context, Writing for the Web, Health, Risk, Controversies, Cultural Science writing.

COMM/S&TS 466 Public Communication of Science and Technology

Required Readings: Packet, various authors, extensive bibliography.

Topics

Public communication of science and technology, Models of science communication, Science literacy, Newspaper and magazine coverage of science, Science on TV and the Web, Science in the movies, Science fiction, Science in museums, Science in the community, Science in institutions, Images of science.

COMM 421 Communication and the Environment

Required Texts: *The American Conservation Movement*, Stephen Fox; *The Age of Missing Information*, Bill McKibben; *Media and the Environment*, LaMay and Dennis; *The Social Creation of Nature*, N. Evernden; *Mass Media and Environmental conflict*, Neuzil.

Topics

Media and environment, Environmentalism and public opinion, News coverage of environmental stories, Environmental politics, Advertising and environmental issues, Narratives and environments, Ecology, Biosocial perspective, Environmental communication research, Environmental quality, Man and environment, Earth Day, Natural history, Environment and television, Environmental pollution, Conservation beliefs, Energy, Education, Communication, Energy conservation, Journalism and the environment, Environmental risk, Hazards, Geography, American environmentalism, Environmental advocacy, Nuclear power, green consumerism, Environmental values in American culture, Public understanding of science, Climate change.

SCIENCE/ENVIRONMENTAL

BIO 207 Evolution

Required Texts: *Darwin on Trial*, Phillip Johnson; *Evolution: History of an Idea*, Peter Bowler; *On the Origin of Species*, Charles Darwin; *Extinction: Bad Genes or Bad Luck?* David Raup; *The Blind Watchmaker*, Richard Dawkins; *Shadows of Forgotten Ancestors*, Carl Sagan and Ann Druyan.

Topics

Science, knowledge, belief, Pattern and process, Biological diversity, homology, cladistic analysis, Phylogenetic analysis, Geological record, time, space, and form, Forerunners of Darwin, Darwin and his theory, Mendelian genetics, Molecular genetics, Origin of Life, Populations and population genetics, Races, varieties, species, speciation, Development, Microevolution and macroevolution, Human evolution, Adaptation.

S&TS 427 The Politics of Environmental Protection in America

Required Texts: *Environmental Policy in the 1990s*, Norman J. Vig and Michael E. Kraft (1993).

Suggested Readings: *Silent Spring*, Rachel Carson; *Breaking the Vicious Circle*, Stephen Breyer; *Uncommon Ground*, William Cronon, ed.; *Our Stolen Future*, Theo Colborn.

Topics

Environmental politics, Law, Science, Citizen activism, Policy problem resolution, Political science, Policy analysis, Sociology, Governments, Environmental controversies, Endangered Species, Air pollution control, Endocrine disruption, Gulf War syndrome, Nature and environment, Risk, Safety, Wilderness, Environmental values, Nuclear power, Environmental activism, Environmental quality, Race, Class, Environmental strategies for industry, Economics and environment, Environmental regulation, Regulation and the courts, Ozone, Air pollutant standards, Carcinogenic hazards, Nerve gas, Trees, International trade and environmental regulation, Global environmental governance, New environmental agenda.

PROGRAM

Iowa State University
Journalism and Mass Communication
Science Communication

Degree Awarded: B.S. in Journalism and Mass Communication
Major: Journalism and Mass Communication
Emphasis: Science Communication

Directory Description

The Department of Journalism and Mass Communication at Iowa State University offers undergraduate and graduate programs in science communication. Along with formal courses in science communication, students can design their programs to match their interests and career goals by selecting an accompanying emphasis in newspaper, electronic media, advertising, public relations, and an area of concentration outside the journalism department in the sciences.

Listed Courses

Science Writing
Mass Communication in Developing Nations
Impact of Technology on Peoples and Societies

School's Program Literature Description

To succeed as a media professional, the student needs a broad-based academic background that the department seeks to ensure by requiring students to take courses outside the department in both a designated area of concentration and specific enhancement areas.

JlMC majors must complete a designated area of concentration (DAC) made up of 24 credits, with at least 15 credits from the 300 level or above. This is a student-designed, adviser-approved grouping of courses outside the department that will meet the student's professional or academic interests. A second major outside the department may count as the DAC.

Syllabi Received 14

COMMUNICATION (1)

JlMC 347/547 Science Writing

SCIENCE/ENVIRONMENTAL (13)

EnvS 123 Environmental Biology
EnvS 482 Environmental Politics and Policies
EnvS 101 Environmental Geology
EnvS 120 Introduction to Renewable Resources
EnvS 293 Environmental Planning
EnvS 324 Energy and the Environment
EnvS 334 Environmental Ethics
EnvS 345 Population Problems and Society
EnvS 380 Environmental and Resource Economics
EnvS 382 Environmental Sociology
EnvS 404 Global Change
EnvS 407 Forest Hydrology and Watershed Management
* Envs 491 Environmental Law

Syllabi

COMMUNICATION

JlMC 347/547 Science Communication

Required Texts: *Scientists and Journalists, Reporting Science as News*, edited by Sharon Freidman, et al.; *Best Science Writing*, Robert Gannon

Topics
None listed

SCIENCE/ENVIRONMENTAL

EnvS 123 Environmental Biology

Required Texts: *Environmental Science*, D.B. Botkin and E.A. Keller

Topics

History, Critical thinking, Systems and change, Biogeochemical cycles, Human population growth, Ecosystems and communities, Biodiversity, Evolution, Productivity and energy flow, Succession, Food, Agriculture, Endangered species, Forests and fisheries, Environment and health, Energy sources, Water, Air, Risk, Waste, Values.

EnvS 482 Environmental Politics and Policies

Required Texts: *Environmental Politics and Policies*, Walter Rosenbaum; *Making Public Policy*, Steven Kelman; *Environmental Policy and Politics: Toward the Twenty-First Century*, Michael Kraft

Topics

Role of politics in making public policy, Institutions, Civil service, Evaluating public policy, Regulatory discontent, State of the environment, Politics of environmental policy, Risk assessment, Air and water policy, Hazardous substances, Energy, Natural resources, Environmental policy in the 21st century.

EnvS 101 Environmental Geology

Required Texts: *Environmental Geology*, Montgomery; *State of the World 1997*, World Watch Institute

Topics

Population crisis, Surface processes, Water resources, Energy resources, Fossil fuels, Waste disposal, Water pollution, Medical geology, Earth, Geologic time, Earth materials, minerals and rocks, Plate tectonics, Mineral resources, Alternative Energy, Natural radiation, Radioactive wastes, Earthquakes, Volcanism, Air pollution, Global climate change.

EnvS 120 Introduction to Renewable Resources

Required Text: *Natural Resource Conservation: Management for a Sustainable Future*, Owen, Chiras, and Reganold

Topics

Renewable resources, History of resource conservation, Conservation law, Resource economics, Conservation ethics, Ecology, Energy flow, Materials cycling, Ecosystem development, Biomes, Populations, Human populations, Soil resources, Water resources, Aquatic biotic resources, Grassland resources, Forest resources, Agroecology, Wildlife resources, Biodiversity, Pest management, Fire ecology, Fire

management, Global change, Risk, Renewable energy resources, Agroforestry, Ecosystem management.

EnvS 293 Environmental Planning

Required Texts: Reader comprised of articles and book chapters

Topics

New views of nature, New problems for environmental regulation and planners, Different ways of interacting with nature, Different problems and different solutions, Models of behavior and environmental damage, Property rights and environmental regulation, Environmental ethics in environmental planning, How an environmental condition becomes an environmental problem within the political and planning processes, Institutional structures for decision making in environmental policy and planning, Participants in environmental planning, Information requirements and the creation of better environmental planning decisions, Creating environmental plans for ecosystems, drainage basins, and watersheds, Watershed management, Thinking about sustainability, Land use practices and the protection of water resources, Landscape planning, Regulating and protecting wetlands, Protecting biological diversity, Preserving open space, Wise-Use movement, Regulation of toxics, Assessment and distribution of risk, Environmental justice movement, Greener cities.

EnvS 324 Energy and the Environment

Required Texts: None listed

Topics

Energy, Energy usage in the U.S. and the world, Fossil fuels: oil and gas, Fossil fuels: coal, Nuclear energy, Air pollution: carbon monoxide, sulfur oxides, particular matter, hydrocarbons, nitrogen oxides, smog episodes, Energy conservation: appliances and lights, industry, transportation, homes, Solar energy: biomass, wind power, water power, photovoltaics, active solar systems, Solar homes.

EnvS 334 Environmental Ethics

Required Texts: *The Environmental Ethics and Policy Book*, edited by Donald VanDeVeer and Christine Pierce

Topics

Historical roots of ecological crisis, Ecology and religion, Native American beliefs, Animal liberation, Animal rights, Ethics of respect for nature, Land ethic, Ecocentric ethics, Deep Ecology, Anti-anthropocentric biocentrism, Nature, self, and gender, Earth, Supply of natural resources, Carrying capacity, Mismanagement of national forests, Radical American environmentalism and wilderness preservation, Value of biodiversity, Why species matter, Greenhouse effect, Silent Spring by Rachel Carson, The disposable society, Sustainable development, Strategic monkeywrenching, Ecosabatage and civil disobedience.

EnvS 345 Population Problems and Society

Required Texts: *Population: An Introduction to Concepts and Issues*, John Weeks

Topics

Population, Population, society, and you, U.S. population characteristics and dynamics, International, Population structure and implications, Population and resources, Population growth, food, and nutrition, Population and the environment, Gender, resource access, and the environment, Population growth and development, Fertility in its social context, Measurement of fertility, Mortality, Migration and urbanization in the U.S., Internationally, Globalization and migration patterns, Population characteristics, diversity, and life chances, Demography, Socio-demographic aspects of aging, Population policies, Methods and uses of estimations and projections, Population and planning development.

EnvS 380 Environmental and Resource Economics

Required Texts: *Environmental and Natural Resource Economics*, Tietenberg; *The Economic Approach to Environmental and Natural Resources*, Kahn

Topics

Basic tools and economic principles, Economic perspective, Market failure, Policy tools, Natural resources, Depletable resources, Energy, Water, Renewable resources, Forests, Wildlife, Resource scarcity, Environmental economics, Pollution control, Air pollution, Stationary source, Global warming, Mobile sources, Water pollution, Sustainability.

EnvS 382 Environmental Sociology

Required Texts: *Who Will Feed China?* Lester Brown; *The Fate of the Forest: Developers, Destroyers and Defenders of the Amazon*, Hecht & Cockburn; *Environment and Society: The Enduring Conflict*, Schnaiberg & Gould

Topics

Environment and society: concepts and perspectives, Environmental sociology, Ideas of nature and the environment, Theoretical streams, Environmental inequality: assessment and resistance, Movements and measurements, Politics of research and environmental knowledge, Gender and the environment, Ecofeminist alternatives and analyses, Women, development and the limits of ecofeminism, Local resources and global debates, Conceptualizing the commons: population, property and politics, Claims and conflicts over tropical resources, Agriculture, development and the environment in a globalizing economy, Sustainable society: possibilities and issues.

EnvS 404 Global Change

Required Texts: None listed

Topics

Earth's environmental systems, Scientific evidence for changes in global environment, Global change issues.

EnvS 407 Forest Hydrology and Watershed Management

Required Texts: Handouts

Topics

Watershed, Geomorphology, Land form and water movement, Soil: infiltration, percolation, water holding capacity, surface and subsurface flows, Erosion and sediment movement, Groundwater and surface water connections, Role of plant communities in water and nutrient movement, Hydrologic cycle, Roles of forests, prairies and wetlands, Terrestrial and aquatic ecosystems linkages, Natural disturbances and human land management, Morphology and dynamics of streams and rivers, and their role in watershed functions, Dynamics of riparian zones, Identification of major water quality, quantity and timing problems facing Iowa, the region, the nation and the world.

* EnvS 491 Environmental Law

Required Texts: *Law and the Environment*, Frona Powell

Topics
Case assignments.

PROGRAM

Lehigh University
Department of Journalism and Communication
Science and Environmental Writing

Degree Awarded: B.A. in Journalism/Science Writing
Major: Science Writing

Directory Description

Lehigh's Science and Environmental Writing Program teaches undergraduate students to write, in terms understandable to the general public, about pure and applied scientific research, technology and engineering, medicine, and the environment. Students are required to take 24 credits of science courses of their choice in addition to the required 34 credits in journalism, science writing, and government courses. Many students choose a major in the sciences or engineering to accompany their science writing major. There is also a science writing minor (17 credits) for students wishing to major in a science or engineering field.

Listed Courses

Basic Science and Technical Writing
Politics of Science
The Environment, the Public and the Mass Media
Science Writing Practicum
Advanced Science Writing
Special Topics in Science Writing
Scientific and Environmental Controversies

School's Program Literature Description

Those enrolled in the science writing program will learn to write for laypersons about pure and applied scientific research, technology and engineering, social science,

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medicine and the environment. They also will receive training in technical writing skills, particularly those related to writing effective reports and journal articles for industry and government organizations.

Core Courses - Science/Environmental

Basic Science and Technical Writing
Politics of Science
Environment, the Public and the Mass Media
Scientific and Environmental Controversies

Syllabi Received 7

COMMUNICATION (4)

JOUR 123/311 Science and Technical Writing
JOUR 125 Environment, the Public and the Media
JOUR/STS 323 Scientific and Environmental Controversies
* JOUR 314 Technical Communication (no longer taught)

SCIENCE/ENVIRONMENTAL (3)

JOUR/STS 124 Politics of Science
STS 11 Technology and Human Values
HIST 315 American Environmental History

Syllabi

COMMUNICATION

JOUR 123/311 Science and Technical Writing

Required Texts: *Scientists and Journalists: Reporting Science as News,* Sharon Friedman, Sharon Dunwoody, Carol Rogers, editors; *Scientific and Technical Writing,* Peter Sandman, Carl Klompus, Betsy Yarrison; *Writing Remedies: Practical Exercises for Technical Writing,* Edmond Weiss; *Best Science Writing,* Robert Gannon; *"White Book"* of additional readings, miscellaneous.

Topics

News story structure, Writing style, Asimov, Batteries, Argument, Mechanism descriptions, Media analysis, Science writing techniques, Interview techniques, Scientists and journalists, Process writing, Editing, Abstracts and summaries, Letters and memos.

JOUR 125 Environment, The Public and the Media

Required Texts: *Watersheds2*, Lisa Newton, Catherine Dillingham; *Media and the Environment*, Craig LaMay, Everette Dennis; *Earth in the Balance*, Al Gore

Readings: *Reporting on the Environment: A Handbook for Journalists*, Sharon Friedman, Kenneth Friedman; *Nature's End*, Whitley Strieber, James Kunetka

Topics

Environmental problems, Perceptions and attitudes in environmental affairs, International environmental problems and issues, Climate change, National environmental issues, Bethlehem Steel, Global Marshall Plan, Environmental journalism, Environmental journalism techniques, Environmental writing styles, Advocacy versus traditional reporting, Newspaper analysis, Environmental coverage problems, Environmental risks and media coverage, Risk communication.

JOUR/STS 323 Scientific and Environmental Controversies

Required Texts: *Science Under Siege*, Michael Fumento; *Our Stolen Future*, Theo Colborn, Diane Dumanoski, John Myers; A Compendium of Selected Readings (no formal title)

Topics

Controversy, Endocrine disrupters, Politics and epidemiology, Dioxin and Agent Orange, Media controversy, Statistics, risk taking and smelly arguments, News and numbers, Alar and food statistics, Alar and food coverage issues, Other food controversies, Problems in risk media coverage, Environmental series writing project.

*** JOUR 314 Technical Communication (no longer taught)**

Required Texts: *Technical Writing: Situations and Strategies*, Michael Markel; *Science News Stylebook*, Science News magazine

Topics

Computers, Defining audience and purpose, Definitions and glossary, Researching, Organizing, Outlining, Writing, Revising, Proofing, Style, Active-passive voice, Partitioning and classifying, Captioning graphics, Describing processes, Writing instructions, Writing proposals and plans, Writing progress and completion, Writing introduction and conclusions, Writing abstracts and executive summaries.

SCIENCE/ENVIRONMENTAL

JOUR/STS 124 Politics of Science

Required Texts: *Science Policy and Politics*, Alexander Morin; *The President's Scientists*, Allan Bromley; *On Being a Scientist*, National Academy of Sciences; *Controversy: Politics of Technical Decision Making*, Dorothy Nelkin, editor

Readings: *Science in the National Interest*, Bill Clinton, Al Gore; *The New Politics of Science*, David Dickson; *Working with Congress: A Practical Guide for Scientists and Engineers*, William Wells, Jr.

Topics

History of science, History of science politics, Federal agencies and science, National Academy of Sciences and American Association for the Advancement of Science, Universities and industry, Role of scientific societies, Science and the White House, The president and funding, Congress and science, Congress and current issues, Science and misconduct, Scientific ethics, Public attitudes toward science, Science in the media, Science in popular culture, Public participation and regulation, Science controversies: moral sentiments vs. scientific values, politics vs. environmental values, economics and health risks, individual rights vs. social goals.

STS 11 Technology and Human Values

Required Texts: *White Noise*, Don DeLillo; *Technology and the Future*, Albert Teich; *Society and Technological Change*, Rudi Volti

Topics

Koyaanisqatsi, Technology's impact on society, Perspectives on technology, Sources of technological change and the science/technology relationship, Diffusion of technology, Technology and the environment, Medical and biological technologies, Technology and the transformation of work, Communications and information technologies, Computers and the information society, Tools of destruction - military technology, Technology and its creators, Ethical role of engineers and businessmen, Role of government in shaping and controlling technology, Reshaping technology.

HIST 315 American Environmental History

Required Texts: *Changes in the Land: Indian Colonists, and the Ecology of New England*, William Cronon; *American Environmentalism: The U.S. Environmental Movement*, Dunlap and Mertig; *Major Problems in American Environmental History*, Carolyn Merchant; *Wilderness and the American Mind*, Roderick Nash

Topics

Native Americans and European background, Changes in the land, Romanticism and the emergence of wilderness appreciation, Transcendentalism, Thoreau, Industrialization, Pastoral ideal, Early preservationists, Emergence of national parks, John Muir, Gifford Pinchot, Hetch Hetchy, Progressive and New Deal conservation, Emergence of ecology, Aldo Leopold, Rachel Carson, David Brower, Alaska, Contemporary environmental movement.

PROGRAM

University of Minnesota-Twin Cities
Department of Rhetoric
Scientific and Technical Communication

Degree Awarded: B.S. in Scientific and Technical Communication
Major: Scientific and Technical Communication

Directory Description

The Department of Rhetoric offers programs for undergraduate and graduate students in Scientific and Technical Communications and Rhetoric and Scientific and Technical Communication.

Listed Courses

Transfer of Technology
Scientific and Technical Presentations
Scientific Controversy

School's Program Literature Description

The Bachelor of Science degree in Scientific and Technical Communication is for the student who is interested in pursuing a career as a scientific and technical communicator and who has an interest in communication skills and science and technology. The major aim of this program is

to provide a sound background in two major categories: communication and science/technology.

Core Courses

Writing About Science
Writing for the Health Sciences
Technology, Self, and Society
In Search of Nature
Science, Religion, and the Search for Human Nature
Scientific Controversy

Additional Courses - Scientific and Technical Emphasis

Environmental Science
Natural Resources and Environmental Studies

Syllabi Received 11

COMMUNICATION (1)

NRES 5800 Natural Resources Interpretation and Communication

SCIENCE/ENVIRONMENTAL (10)

Rhet 1303 Science, Religion, and the Search for Human Nature
Rhet 3390 Technology, Society, and Self
Rhet 3395 In Search of Nature
NRES 1040 Natural Resources as Raw Materials
NRES 1201 Conservation of Natural resources
NRES 1001 Orientation to Natural Resources and Environmental Studies
NRES 1020 Information Technology in Natural Resources
NRES 3010 Ethics and Values in Resource Management
NRES 3070 From Local to Global Ecology
NRES 3100 Conservation of Biodiversity

Syllabi

COMMUNICATION

NRES 5800 Natural Resources Interpretation and Communication

Required Texts: *Environmental Interpretation*, Sam Ham; *Interpreting Our Heritage*, Freeman Tilden; *The Interpreter's Handbook*, Gross/Regnier; *The Museum Experience*, Falk and Dierking

Topics

Definitions of interpretation, Visitor information systems, Basic communication principles, Interpretive principles, Goals and objectives of interpretive programs, Defining themes, Telling stories, How visitors learn, Understanding audiences, Interpretive media, Slide programs, Puppets/character interpretation, Signs and labels, Brochures, Exhibits and displays, Museums, Trail guides, Visitor centers, Interpretive planning, Cultural and historical interpretation.

SCIENCE/ENVIRONMENTAL

Rhet 1303 Science, Religion, and the Search for Human Nature

Reading Materials: *The Holy Bible* (any version); *Origin of Species*, Darwin; *Mere Christianity*, Lewis; *Ishmael*, Quinn; *The Celestine Prophesy*, Redfield; *Galapagos*, Vonnegut

Topics

Darwin's views, History of The Bible, The Gnostics and the Apocrypha, Different religious beliefs, Religious themes, Creationism, Copernicus and Galileo, Malthus, Darwin's theory, Social Darwinism, Nietzsche, Human values, Ishmael, Laws of nature, God and prayer, Cloning, Monsters and atomic destruction, Frankenstein, Galapagos.

Rhet 3390 Technology, Society, and Self

Required Texts: *A Hitchhiker's Guide to the Galaxy*, Adams; *The Soul of a New Machine*, Kidder; *A Connecticut Yankee in King Arthur's Court*, Mark Twain

Topics

Technology, Technology and self, Mass production, Mass consumption, Technology and society, Mark Twain, Technology and nature, Technology and the land, Technology and the modern mind, Kidder, Adams.

Rhet 3395 In Search of Nature

Required Texts: *On Nature*, Daniel Halpern; *Stone Work*, John Jerome; *The Solace of Open Spaces*, Gretel Ehrlich; *Mississippi Solo*, Eddy Harris

Topics

Language of nature discourse, Nature as sacred space, Judeo-Christian traditions, Pantheism, Deism, Transcendentalism, Native American traditions, Nature as

artistic space, Music, Literature, Paintings, Aesthetics of nature artifacts, Nature as social space, Voluntary simplicity, Solitude, Wilderness, Rural and urban tensions, Gender attitudes, Nature as working space, Images of rural life, Farmer, Rancher.

NRES 1201 Conservation of Natural Resources

Required Text: *Natural Resource Conservation: Management for a Sustainable Future*, Owen

Topics

Human population growth, Resource use, Environmental degradation, Pollution, History conservation movement, Ecology, Classification of natural resources, Organizational levels, Basic resources, Water, Soils, Forests, Wildlife, Fisheries, Rangelands, Natural resources concerns, Outdoor recreation, Perpetual, renewable, and nonrenewable energy sources, Economics and the environment, Conservation ethic and individual responsibility, State of the environment.

NRES 1040 Natural Resources as Raw Materials

Required Texts: None listed

Topics

World and U.S. population growth, Energy Resources and Consumption U.S. and worldwide, Renewable energy, Nonrenewable industrial material options, Minerals and metals, Environmental consequences of Exploration, gathering, processing, and use, Plastics, Environmental impacts, Industrial raw materials in international trade, Raw material options, Wood, Forest and forestry, Forest distribution, Forest management, Tropical forest deforestation, Plantations, Preserving the rainforest, Sustainable forest management, Recycling programs, Expanding populations, Sustainability.

NRES 1001 Orientation to Natural Resources and Environmental Studies

Required Texts: None listed

Topics

Major issues, Politics and participants in environmental issues, Working in the environmental arena, Landscape planning issues, Global change implications for vegetation management, Forest resources/international issues.

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NRES 1020 Information Technology in Natural Resources

Required Texts: None listed.

Topics

Operating systems, E-mail, Internet software tools, Word processing basics with Word, Lumina and on-line indexes, Creating presentations with PowerPoint, Exchanging data between applications/platforms, CD ROM indexes, Forestry Library indexes on gopher, Spreadsheet basics with Excel, Hardware.

NRES 3010 Ethics and Values in Resource Management

Required Texts: *A Sand County Almanac: with essays on conservation from Round River*, Leopold

Topics

Deep Ecology, Environmental education, Land ethic, Creating a conservation and professional ethic, Wilderness risk and recreation, Sport hunting, trapping, fishing, Population, Native peoples and harvest rights, Activist groups, Animal rights, Science and advocacy, Values and ethics, Codes of ethics, Conflict, dispute, settlements, Silent negotiation.

NRES 3070 From Local to Global Ecology

Required Texts: *Environment*, Raven, Berg, and Johnson

Topics

None listed

NRES 3100 Conservation of Biodiversity

Required Texts: *Principles of Conservation Biology*, Meffe and Carroll

Topics

Conservation values and ethics, The species in conservation, Global biodiversity, Genetics, Demographics, Community- and ecosystems-level conservation, Habitat fragmentation, Conservation reserves, Principles of conservation management, Applications of conservation management, Conservation management case studies, Ecological restoration, Ecology, politics, and economics, Institutions and policymaking in conservation, Conservation biologists in the policy process, Sustainable development case studies, Conservation challenges.

PROGRAM

Ohio State University
School of Natural Resources
Environmental Communication, Education, and Interpretation

Degree Awarded: B.S. in Natural Resources
Major: Environmental Communication, Education, and Interpretation

Directory Description

This program trains communicators for various professions in collecting, interpreting and disseminating science/environmental information. The program objective is to combine a strong interdisciplinary background with skills for written and spoken media in formal and informal settings. Requires basic courses for a major in natural resources, with coursework in selected medium or on communications processes.

Listed Courses

Case Studies and Evaluation of Environmental Communication
Communication of Environmental and Natural Resources Information
Skills for Environmental Communication

School's Program Literature Description

The philosophy of this program is that an informed public is a key component of responsible environmental behavior. This program provides students with the skills to deliver to the public timely and accurate information about environmental processes, allowing students to specialize in environmental communication, education, or interpretation while providing a broad understanding of all three options.

The environmental communication option focuses on the methods of information communication through mass and targeted media sources, such as newspaper, video, television, and radio. The environmental education option focuses on the methods of teaching environmental information in the classroom setting. The interpretation option prepares students to present environmental information in natural and historical settings.

Core Courses

Ecosystem Management
Environmental Interpretation and Visitor Services
Introduction to Environmental Science
Methods for Conservation Education
Natural History of Ohio
(two additional management courses)

Other Available Courses to be selected with adviser assistance include:

Communicating Environmental and Natural Resources Information
Environment: The American Experience
Environmental Science and Management
Natural Resources Data Analysis
Natural Resources Management
Natural Resources Policy
Skills for Environmental Communication

Syllabi Received 9

COMMUNICATION (3)

NAT RES 610 Environmental Interpretation and Visitor Services
NAT RES 613 Methods for Conservation and Outdoor Education
NAT RES 615 Skills for Environmental Communication

SCIENCE/ENVIRONMENTAL (6)

NAT RES 100 Environmental Science and Management
NAT RES 200 Ecosystem Management
NAT RES 222 Natural Resources Data Analysis
NAT RES 367 Environment: The American Experience
NAT RES 400 Natural Resources Policy
NAT RES 606 Natural Resources Management

Syllabi

COMMUNICATION

NAT RES 610 Environmental Interpretation and Visitor Services

Required Texts: *Interpreting the Environment*, Grant W. Sharpe, ed.; *Interpreting Our Heritage*, Freeman Tilden; *Interpreting for the Park Visitor*, William J. Lewis.

Topics

Definitions and principles of interpretation, History, literature, terminology, and philosophical orientations of environmental interpretation, Environmental information systems, Biological diversity, Communications theory, Interpreting critical resources issues, Managing and marketing of interpretative programs, International aspects of natural resources, Conflict resolution, and many other particulars to the communication process.

NAT RES 613 Methods for Conservation and Outdoor Education

Required Texts: *Integrating Environmental Education and Science, PLT Environmental Education Activity Guide, Project Wild Activity Guide, Project Wild Aquatic Activity Guide*

Topics

Techniques of instruction in environmental education, Concept delineation, Activity development, Module design, Identification skills, Materials development, Methodologies, Water, Animals, Plants, Earth's crust, Major environmental management concepts: biophysical, social-cultural, environmental management, change, Activities for pre-school, lower elementary, upper elementary, junior high school, senior high school, adult, family, and senior citizen, Aquatic organisms, Trees, Wild flowers.

NAT RES 615 Skills for Environmental Communication

Required Texts: *Taking Sides: Clashing Views on Controversial Environmental Issues,* Goldfarb; *The Reporter's Environmental Handbook,* West, Sandman & Greenberg.

Topics

Skills development and practice in communicating natural resources/environmental information through written and broadcast media, translating results of research, technical skills for production of various forms of presentational, written, and audio-visual communications.

SCIENCE/ENVIRONMENTAL

NAT RES 100 Environmental Science and Management

Required Texts: None listed

Topics

The nature of scientific inquiry and the biosphere, Science of ecology and ecosystem dynamics, Climate, microclimates and organisms, Soil environment -- physical,

chemical, and biological, Aquatic environment -- freshwater and saline, Energy transfers in ecosystems, Cycling of materials, Primary and secondary productivity, Population ecology, Community ecology and succession, Biomes-- major ecosystems of the world, Human population growth, Land use, Water resources, Fuel energy use -- national and global, Atmospheric deposition, Greenhouse effect, Ozone 'hole', Global change, Economic systems, Growth and development, Disturbed ecosystem rehabilitation, Resource conservation, Biological diversity, Sustainable development, Conflict resolution, Ethical and philosophical considerations.

NAT RES 200 Ecosystem Management

Required Texts: *Conservation Ecology: Biosphere and Biosurvival*, George W. Cox; *Case Studies Booklet for Ohio State University.*

Topics

Alternative resource management practices, Ecological principles and resource management problems, Individual and population dynamics; Case studies in Fisheries, Wetlands, Pollution, Exotics, Endangered species, Forestry, Wildlife, Sustainable Agriculture, Parks and preserves, Boundary waters.

NAT RES 222 Natural Resources Data Analysis

Required Texts: *Elementary Statistics*, Seventh Edition, Robert Johnson

Topics

Descriptive statistics, Probability, Inferential statistics.

NAT RES 367 Environment: The American Experience

Required Texts: *American Environmentalism: Readings in Conservation History*, 3rd, Roderick Nash; *Encounters with the Archdruid*, John McPhee; *A Sand County Almanac and Sketches Here and There*, Aldo Leopold; *Silent Spring*, Rachel Carson.

Topics

American Indian philosophies and relationships with their environments, European colonists, Modern day developments and current perspectives, Resource use and environmental changes in historical perspective, Utilitarian conservation policies, Ecological devastation and economic depression, Wilderness Attitudes, Evolution of the

environmental movement, Dominant worldviews, Revolutionary philosophies, Gifford Pinchot, John Muir, Aldo Leopold, Rachel Carson, Deep Ecology, Wise Use movement, Controversial environmental issues.

NAT RES 400 Natural Resources Policy

Required Texts: *Understanding Environmental Administration and Law*, Susan J. Buck; *Outlines and Other Brief Materials for Lectures, Copyrighted and Other Readings or References, The Council on Environmental Quality Annual report for 1992*

Topics

Natural resources conservation and management, Natural resources issues, Policies, Powers, Structures, Processes, Policy formulation, implementation, and evaluation, Planners and managers of natural resources -- difficulties, Coalitions of support, Proposed alternative management plans, Conflict resolution, Private interest groups, Public agencies, Public policy process model and associated concepts, Trends in resource use, environmental quality, and public policies, Property rights, Public powers, The Constitution, Land survey systems, Navigable waters and waters of the U.S., Tragedy of the Commons, Water quality standards, Water pollution control policies, Production economics, Planning, Risk assessment, Bureau of Land management lands, National forests, Endangered species, Solid, hazardous, and toxic waste management, Food Security Act, Clean Water Act, Clean Air Act.

NAT RES 606 Natural Resource Management

Required Texts: None listed

Topics

Management of resources, Integrated resource management, Forest management planning process, Policy, formulation and implementation, Planning, inventory, assessment, and monitoring, Forest age distribution, Maps and histograms, Topo sheets and aerial photos, NEPA, Environmental documents, Many other particulars.

PROGRAM

University of Tennessee
School of Journalism
Science Communication

Degree Awarded: B.S. in Communication
Emphasis: Science Communication

Directory Description

The School of Journalism offers seven courses in science communication that allow graduate and undergraduate students to specialize in science communication. At least four of these courses are offered each year. All seven courses are open to graduate and undergraduate students.

Listed Courses

Writing About Science, Technology, and Medicine
Environmental Reporting
Science Writing as Literature
Seminar in Science, Society, and the Mass Media
Seminar in Health Communication
Seminar in Risk Communication
Issues in Science Communication

School's Program Literature Description

These courses can provide a specialization in Science Communication for graduate students and an emphasis in Science Communication for undergraduates in the College of Communications and other departments.

Two offerings (J450,J451) are advanced skills courses. Three (C551,C552,C553) are seminars. Two courses (J455,J456) are interdisciplinary and provide for investigations of current topics in science communication. Several of these courses are appropriate for the honors program in the College of Arts and Sciences.

Courses

Same as listed in the Directory.

Syllabi Received 6

COMMUNICATION (6)

JOUR 450 Writing About Science, Technology, and Medicine

Required Texts: *Best Science Writing: Readings and Insights*, Robert Gannon, ed.

Topics

Scientific journals, Scientific journal stories, Scientific journal articles, Interpreting graphs and numbers, Sea slugs, News conference, Interviewing techniques, Technical talk, Problem solving in science writing, Jargon and technical terms in science writing, Science news for broadcast, Structure and Storytelling, Science and art, Science news radio stories, Public relations for science, Feature stories and magazine articles in popular science, Getting published, Covering science policy, Author's voice, Investigative science reporting, Technical communications.

JOUR 451 Environmental Reporting

Required Texts: *Environmental Issues for the '90s: A Handbook for Journalists*, Robert Logan with Marie Tessier and Stacy Christiansen

Topics

Clearcutting, Internet resources for environmental journalists, Environmentalism and environmental journalism, Environmental websites, Covering environmental issues, Key environmental laws and agencies, Air resources, Environmental engineering, Air quality, Energy, environment and resources, Solid waste, Water quality, Pesticides and water, Plants and soils, Forests, Introduced species, Zootic diseases, Endangered species, News media and nuclear power, Rainforest loss, Environmental justice.

JOUR 456 Science Writing as Literature

Required Texts: *Galileo*, Brecht, Bertolt; *Silent Spring*, Rachel Carson; *The Siderail Messenger*, Galileo Galilei; *Red-Spotted Newt*, Doris Gove; *In Suspect Terrain*, John McPhee; *The Red Queen: Sex and the Evolution of Human Nature*, Matt Ridley; *Confessions of a Knife*, Richard Selzer; *Longitude*, Dana Sobel; *The Riddle of the Dinosaur*, John Wilford; *The Right Stuff*, Tom Wolfe

Topics

In depth analysis of authors' literary qualities.

COMM 551 Science, Society and the Mass Media

Required Texts: *Selling Science: How the Press Covers Science and Technology*, Dorothy Nelkin; *River Out of Eden: A Darwinian View of Life*, Richard Dawkins; *Biology as Ideology: The Doctrine of DNA*, R.C. Lewontin; *Science Under Siege*, Michael Fumento

Topics

Science and media, Science as ideology, Creationism, Anti-science as ideology, Eugenics, Genetics, Human genome project, Environmentalism, Animal rights, Cold fusion, Fraud in science.

COMM 552 Seminar in Health Communication

Required Texts: *Designing Health Messages: Approaches from Communication Theory and Public Health Practice*, Edward Maibach and Roxanne Parrott, editors; *Health and the New Media: Technologies Transforming Personal and Public Health Practice*, Linda Harris, ed.; *Mass Communication and Public Health*, Charles Atkin and Lawrence Wallack, editors; *Media Advocacy & Public Health: Power for Prevention*, Lawrence Wallach, Lori Dorfman, David Jernigan and Makani Themba

Topics

Issues in health promotion, Role of the media, Mass Comm and public health, Designing health messages, Advertising issues, Television and health, News media and health issues, Media Advocacy, Youth and health, Health education, Health information, Health and the new media, Health delivery issues and new media.

COMM 553 Seminar in Risk Communication

Required Texts: *Public Communication Campaigns*, R.E. Rice, C.K. Atkin; *The Environmental News Source: Providing Environmental Risk information to the Media*, P. Sandman, D. Sachsman, M. Greenberg; *Reporting on Risk*, E. Singer, P. Endreny

Topics

Crisis communication, Crisis communication planning, Risk communication, Managing organizational impressions in crisis situation, Creating a web page, HTML, Providing information to journalists, Risk communication for journalists, Risk assessment, Environmental Toxicology for journalists, Media coverage of risk, Information campaigns.

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PROGRAM

Western Washington University
Huxley College of Environmental Studies
Environmental Journalism

Degrees Awarded: B.A. in Environmental Studies/Journalism
Combined Major: Environmental Studies/Journalism

Directory Description

Western Washington University offers undergraduate-level courses in environmental journalism and environmental writing through two programs: Environmental Journalism and Environmental Education/Mass Communication. Students take a variety of courses in environmental science and journalism. All Huxley students take core courses involving scientific issues, research, and theory. All environmental journalism students recognize they are disseminating science to a lay audience.

Listed Courses

Environmental Journalism
Advanced Environmental Writing
Writing for The Planet (student quarterly)

School's Program Literature Description

A combined major is offered cooperatively by Huxley College and the Department of Journalism. The degree awarded is a B.A. in Journalism. This program was initiated informally a number of years ago by students themselves with aptitude and interest in developing their communication skills. It has grown steadily and systematically, but continues to be innovative and has attracted wide attention and recognition.

The emphasis is on writing with a purpose: to present data as a means of making wise, informed decisions on critical environmental issues, ranging from global warming and population growth to wildlife and forest conservation and local land use.

The program encompasses courses from journalism in news writing, reporting, copy editing, hands-on desktop publishing, and photo-journalism coupled with conservation history, physical science, biology, and chemistry.

Core Courses

Environmental Systems
Environmental Disturbances
Human Ecology
Environmental and Resource Policy
Environmental History and Ethics
Fundamentals of Ecology
Environmental Journalism
The American Literature of Nature and Place
Environmental Interpretation Methods

Syllabi Received 9

COMMUNICATION (3)

ENVR 477 The American Literature of Nature and Place
ENVR 479 Environmental Interpretation Methods
ENVR 481 Environmental Journalism

SCIENCE/ENVIRONMENTAL (6)

ENVR 301 Environmental Systems
ENVR 302 Environmental Disturbances
ENVR 303 Human Ecology
ENVR 304 Environmental and Resource Policy
ENVR 305 Environmental History and Ethics
ENVR 325 Fundamentals of Ecology

Syllabi

COMMUNICATION

ENVR 477 American Literature of Nature & Place

Required Texts: *The Outermost House*, Henry Beston; *Refuge*, Terry Tempest Williams; *The Meadow*, James Galvin; *The Norton Book of Nature Writing*, Robert Finch & John Elder, eds.

Topics

Natural history authors Thoreau, Emerson, Muir, Burroughs, Leopold; Wallace Stegner, Edward Abbey, Annie Dillard, Barry Lopez, Gretel Ehrlich; Descriptive and expository writing skills, Critical reading of literary works, Literary research; Historical background of nature writing: European origins, Romanticism, Transcendentalism, The American setting, Evolution of environmental consciousness; The sea, The arctic, The midwest, Western writing, Native American expression, Southwest desert writing, Voices from the scientific community, Poetic expression.

ENVR 479 Methods in Environmental Interpretation

Required Texts: *Environmental Interpretation*, Sam Ham; *Signs, Trails and Waysides*, Suzanne Thorpe

Reading packet

Topics

Interpretive media, Interpretive planning, Interpretive research, Interpretive writing, Brochures and signs, Interpretive graphics, Interpretive exhibit, Interpretive slide/tape program, Interpretive video with written script.

ENVR 481 Environmental Journalism

Required Texts: *The Second John McPhee Reader*, John McPhee; *Writing Nature: An Ecological Reader for Writers*, Carolyn Ross, ed.

Topics

Subject and audience conflict, Issues in environmental science, politics, and economics, How writers interpret stories for readers of magazines and newspapers, Straight journalism, Creative nonfiction.

SCIENCE/ENVIRONMENTAL

ENVR 301 Environmental Systems

Required Texts: *Ecology and Our Endangered Life-Support Systems*, E.P. Odum

Topics

Lithosphere, Biosphere, Systems approach, Ecosystem structure, Ecosystem function: production, decomposition, water cycle, biodiversity, Ecosystem change: succession, Ecosystem types, Ecosystems in landscapes.

ENVR 302 Environmental Disturbances

Required Texts: *State of the World*, Lester Brown et. al.

Topics

Rio De Janeiro "Earth Summit", Global perspectives on disturbed systems, Human populations, Agriculture and food supply, Global climate change -- real or imagined, Understanding the value of nature, Atmospheric disturbances: air pollution, acid rain, ozone thinning, Energy and environmental disturbance, Pesticides and bioengineered crops.

ENVR 303 Human Ecology

Required Texts: *Land Use, environment, and social change: The shaping of Island County*, Richard White; *Environmental Problems and Human Behavior*, Gerald Gardner & Paul Stern; *Our Ecological Footprint*, M. Wackernagel & W. Rees

Reading packet

Topics

Human modification of ecological processes, Human action in ecosystems, Technology, institutions and ideology, The human-ecology relationship, The problem of the commons, and the educational, economic, social, and systemic ways of addressing it, Human adaptability, Organismal development, Individual consciousness, Cultural processes, Human ecology and the Pacific Northwest, Cultural patterns and change, Complex social-technological-ecological systems and implications for the future, Population and consumption, Evolution, Sustainability, Beliefs, education, and information, Markets and incentives, Intentional community, Technology and society, Complex systems, chaos, and self-organization, Adaptive management.

ENVR 304 Environment and Resource Policy

Required Texts: *Western Pacific Lands and Environmental Politics*, Charles Davis; *Environmental Law*, Nancy K. Kubasek; *The Final Forest*, William Dietrich

Supplements, including Internet assignments

Topics

Policy and government, Agencies, National Environmental Policy Act (NEPA) and regulations, Washington State Environmental Policy Act (SEPA), Council on Environmental Quality (CEQ), The public domain: public land ownership and management, Multiple use and sustained yield, Grazing lands and agriculture, Tragedy of the commons, National parks and wilderness policy, Forest lands and national forests, Wildlife - endangered species, Conservation plans, Endangered Species Act, Private forestry interests, Northwest ecosystems, Forest service resources, State forestry regulations, Federal water resource development, Water allocation, Energy and federal lands, Mining policy on federal lands, Pollution law and policy, National Ambient Air Quality Standards (NAAQS), State Implementation Plans (SIPS), New Source Performance Standards (NSPS), Mobile source standards, Hazardous air pollutants, National Pollution Discharge Elimination System (NPDES), Regulation of non-point sources, Safe Drinking Water Act, Clean Water

Act: wetland protection, Resource Conservation and Recovery Act (RCRA), Toxins: Emergency Planning and Community Right-to-Know Act, Comprehensive Environmental Response, Compensation and Liability Act - Superfund (CERCLA), "Brownfields" issues.

ENVR 305 Environmental History and Ethics

Required Texts: *The Rights of Nature: A History of Environmental Ethics*, Roderick Nash; *American Environmentalism: Readings in Conservation History*, Roderick Nash; *Reflecting on Nature: Readings in Environmental Philosophy*, Lori Gruen & Dale Jamieson.

Topics

Environmental historiography, Anthropogenic environmental degradation, Moral extensionism, Ancient Western & Christian views, Christian & Medieval, Scientific revolution & modernism, Systems, ecology, chaos, Native Americans & Colonists, Frontier and conquest of the West, Conservation movement, 1920s and the New Deal, Post-WWII and environmental movements, Environmental crisis and new environmental legislation, Environmental justice, Ecofeminism, Deep ecology, Social ecology, Sustainability, Economic models, International justice, Moral values, Species and ecosystems, Environmental virtue, Wilderness preservation, Population and future generations, Biodiversity.

ENVR 325 Fundamentals of Ecology

Required Texts: *Ecology and Field Biology*, R.L. Smith

Topics

Ecological inquiry, The physical environment, Physiological ecology - responses and adaptations, Behavioral ecology, Evolutionary ecology - processes and population genetics, Ecosystem ecology - concepts, biogeochemical cycles, biodiversity, Landscape ecology - spatial patterns, Population ecology - populations, growth, dynamics, Population interactions - prey-predator, plant-herbivore, parasite-host, competition, mutualism, Community ecology - structure, trophic dynamics, disturbance, Ecology and conservation.

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